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THE JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

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The Journal of Botany was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

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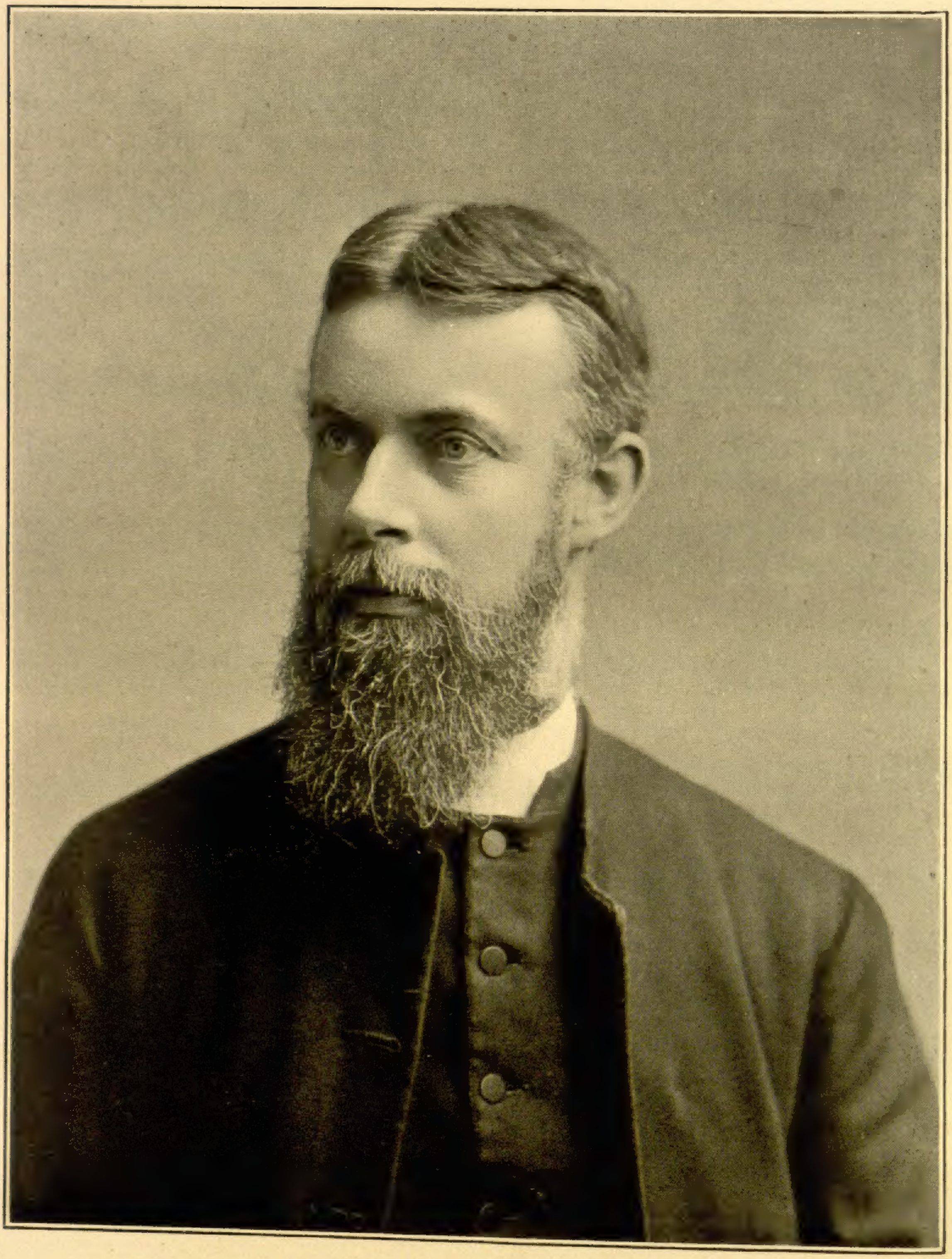

Yours Truly

R. P. Murray.

THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN.

RICHARD PAGET MURRAY

(1842—1908).

(WITH PORTRAIT)

Richard Paget Murray, who died Oct. 29, was born Dec. 26, 1842, at Thornton, I. of Man, the eldest son of Colonel Henry Murray and a descendant of the third Duke of Athole; his family became Lords of Man in the eighteenth century. At Cambridge he took the highest honours, being first in the First Class of the Natural Science Tripos in 1867. His special subject was Botany; this brought him into close connection with Prof. Babington, of whom he always spoke with great regard. In 1882 he was elected F.L.S. Ordained in 1868, he held curacies at Plymstock and Beckenham. From 1877 to 1882 he had the sole charge of Baltonsborough, Somerset; and for the last twenty-five years of his life he was Vicar of Shapwick, Dorset, where he was laid to rest on November 3rd. I paid him several visits there, and he was evidently much respected and beloved by his parishioners. He was a High Churchman, a good extempore preacher, and latterly an able and active member of the Salisbury Diocesan Synod.

Our friendship began in 1882, when he was living at Wells, Somerset; and I am greatly indebted to him for much encouragement in the study of our native plants, as well as for the acquaintance of many distinguished botanists. He was a delightful, affectionate companion, well-informed, and with a keen sense of humour.

Before going on to speak particularly of his botanical work, I may mention that he was also an entomologist of distinction. From Mr. J. Cosmo Melvill, who acquired his collection a good many years ago and has presented the bulk of it to the Manchester Museum, I learn that in 1873–4 he described ten new foreign species of the "blue" butterflies (*Lycæna*); one of them, *L. Pryeri*, from Japan, being the finest known in that genus.

After various rambles together in Somerset, we visited Upper Teesdale and the Settle district in 1883; and in the following year

we had an interesting trip to the rich department of Charente-Inférieure, W. France, besides other excursions nearer home.

Murray did a good deal of work in the Alps and Dolomites; and his expedition to Ireland in 1885 led to the discovery of *Arabis ciliata* Br. in Co. Clare. An extremely interesting paper in Journ. Bot. 1888, pp. 173–9, gives the chief results of a six-weeks tour in Portugal the year before, which added to its flora the very rare umbellifer *Butinia bunioides* Boiss., and a new species of bramble (*Rubus lusitanicus*) allied to *R. villicaulis* and *R. macrophyllus;* both were from the Serra do Gerez. In Journ. Bot. 1889, pp. 141–3, will be found a valuable note on *Sedum pruinatum* Brot. in which he maintains its distinctness from our *S. rupestre;* I had a specimen of his growing for some time, and can fully confirm his opinion. Later on, the botany of the Canary Islands, which he explored for several seasons, engaged his special attention. His hope that he might eventually publish a complete Flora of the group was unfortunately frustrated by failing health; but he described in these pages several new species, viz. *Lotus salvagensis, L. dumetorum, L. emeroides, Vicia scandens, Sedum lancerottense, Sempervivum percarneum,* and *S. hierrense.* Specimens of all his Canarian gatherings are now at Kew; his own herbarium is in the National Herbarium at South Kensington.

Murray's intimacy with Archer Briggs, Moyle Rogers, and the Lintons naturally led him to take special interest in the study of *Rubus.* He was one of the clerical quartette who issued the valuable Set of our British brambles, and himself described that handsome endemic species *R. durotrigum* (Journ Bot. 1892, pp. 15–16), as well as a var. *silvestris* of *R. rosaceus* (1894, pp. 47), which is perhaps only a weak woodland form of var. *hystrix* (Weihe & Nees).

His chief contribution to British botany was the *Flora of Somerset* (1896), well reviewed by Mr. S. T. Dunn in Journ. Bot. 1897, pp. 150–3. Ever since I came to live in the county I have constantly consulted this book, and have been greatly impressed by the care and accuracy which distinguish it. Much use was made of Mr. J. W. White's *Flora of the Bristol Coal-field,* of which I understand that a second edition may soon be expected, in dealing with the northern districts. He was an energetic member of the Dorset Field Club, and contributed largely to the second edition of Mansel-Pleydell's *Dorset Flora.*

As Murray did not separate his British and foreign herbaria, he mainly followed the nomenclature of Nyman's *Conspectus;* he does not, indeed, appear to have taken very much interest in the recent changes, being more addicted to the critical study of plants themselves. And, as was to be expected from one who collected so largely abroad, his views about the limits of species were somewhat wider than those which commend themselves to most special students of our insular flora.

EDWARD S. MARSHALL.

SOME NEW JAMAICA ORCHIDS.

By W. Fawcett, B.Sc., F.L.S., & A. B. Rendle, D.Sc., F.L.S.

During twenty-one years spent in Jamaica one of us devoted some attention to making as complete as possible a collection of the orchids of the island. The specimens, together with a fine series of drawings made from the living plants by Miss H. A. Wood, were brought to England some years ago with the idea that we should jointly prepare a systematic account of them. A monograph of the Jamaican species of *Lepanthes* was published in the *Transactions of the Linnean Society* (ser. 2, vii. 1, 1904), and the results, which increased the number of species known from the island from seven to twelve, seemed of sufficient interest to justify us in preparing a monograph for Jamaica of the order as a whole. Owing to pressure of official duties the work proceeded slowly until recently, when the retirement of one of us gave leisure for pushing on with it. The Trustees of the British Museum have consented to publish the monograph; and as the descriptions, as usual in colonial Floras, will be in English, it is necessary, for effective publication, according to the Vienna Code, to publish diagnoses of new species in Latin. We are indebted to the Editor for granting us the hospitality of his Journal for this purpose.

Pleurothallis hirsutula. Herba caule repente radicante, caulibus secondariis cæspitosis quam folia longioribus ancipitibus bicanaliculatis; vaginæ tres flaccidæ, duæ inferiores atro-brunneo-hirsutulæ. Folia sessilia lanceolata, basi amplectentia. Racemi 4–5-flori 1–5-fasciculati, foliis subtriplo breviores. Bracteæ ochreatæ truncatæ. Sepala erecto-patentia trinervia supra carnosula; posticum lanceolatum subacuminatum concavum; lateralia anguste triangulari-lanceolata acuta, basi connata et in mentum breve producta. Petala rhomboidea, basi angustata, marginibus superioribus minute erosis. Labellum ovatum breviter unguiculatum, margine undulato. Columna tenuis curvata.

Secondary stems 6-10 cm. l. Leaf 5–7·5 cm. l., 1–1·3 cm. br. Raceme 1·2–2·5 cm. l. Bracts 2 mm. l. Flowers very dark red. Dorsal sepal 6·5 mm. l., lateral slightly shorter. Petals slightly exceeding 3 mm. l. by 1·5 mm. br. Lip 2·75 mm. l. by 1·25 mm. br. Column 2·25 mm. l.

Hab.—On trunks of trees, Holly Mount, Mt. Diabolo, 2600 ft., 6681; 3000 ft., 9890; in fl., Aug., *Harris*!

A member of Lindley's Section *Sicariæ* of the habit of *P. floribunda* Lindl., but distinguished by its deep red flowers and absence of teeth from the lip.

Pleurothallis Morrisii. Herba parva caulibus filiformibus cæspitosis teretibus folio subæquilongis; vaginæ duæ atro-brunneæ appressæ. Folium sessile anguste lanceolatum subacuminatum. Pedunculi 2-fasciculati 1-flori brevissimi. Sepala, posticum late ellipticum 3-nervia, lateralia connata late elliptica

2-nervia apice 2-dentata. Petala subulata. Labellum breviter unguiculatum ad pedem columnæ articulatum obtusum concavum margine crasso. Columna brevis, clinandrio antice longe angusteque producto.

Stem 30–50 cm. l. Upper sheath 7–9 mm. l. Leaf 40–50 cm. l., 5–8 mm. br. Sepals 3·5 mm. l., dorsal 2 mm. br., lateral somewhat broader. Petals 2·5 mm. l. Lip 2·4 mm. l., 1·6 mm. br. Column 1·5 mm. l.

Near *P. Wilsoni* Lindl., but at once distinguished by the leaf, the subulate petals, and entire lip. 28, *Morris* ! The species is named after Sir D. Morris, who made a large collection of orchids whilst he lived in Jamaica as Director of Public Gardens and Plantations.

Pleurothallis Helenæ. Herba parva cæspitosa caulibus brevissimis, vaginis brevibus ochreatis acutis. Folia oblanceolata basi in petiolum angustata. Racemi pauciflori filiformes quam folia duplo longiores. Bracteæ ochreatæ acutæ. Flores longepedicellati. Sepala libera patentia ovata caudata glabra. Petala subrhomboidea superne fimbriata, apice caudata, quam sepala $\frac{1}{3}$ breviora. Labellum quam petala subduplo brevius, trilobatum, lobis lateralibus late rotundatis superne fimbriatis, lobo medio ovato obtuso. Columna cum anthera conica labello æquilonga. Capsula obovoidea.

Plant 3–5 cm. high. Leaf, including petiole, 10–15 mm. l. Sepals about 4 mm. l.; pale greenish, as also are the petals. Lip marked with crimson. Column lined with crimson.

Hab.—On trunks of trees, Mabess River, 3500 ft.; in flower, July, in fruit August, *Harris* !

Described from detailed drawing by Miss H. A. Wood, after whom the plant is named.

Near *P. setigera* Lindl. but a smaller plant with smaller flowers. The sepals and petals have relatively shorter tails, the petals are less deeply fimbriate. The lip is lobed, relatively shorter, and bears no cilia at the base or on the keel. It also closely resembles *P. aristata* Hook., but is at once distinguished by the differently shaped and relatively larger and broader caudate petals; also by differences in the lip, which in *P. aristata* has a pubescent elliptical midlobe.

Pleurothallis trilobata. Herbula cæspitosa caulibus filiformibus, folio elliptico, basi in petiolum tenue angustato, æquilongis; vaginæ 2 vel 3 ochreatæ, caulem tegentes, ostio ovato acuto muriculatæ. Racemi uni-vel pauci-flori, solitarii vel duo, filiformes, flexuosi, folio multo longiores. Bracteæ spathaceæ lanceolatæ acutæ. Sepala ovato-acuminata usque ad medium trinervia; lateralia angustiora usque ad medium connata. Petala oblonga obtusissima, basi angustata, uninervia, sepalis plus quam duplo breviora. Labellum trilobatum trinerve, lobo medio oblongo, apice crenulato, lobis lateralibus rotundatis paullo longiore.

Stem about 7 mm. l. Leaf 7 mm. l., nearly 3 mm. br. Scape 2 cm. l. Bracts ·6 mm. l. Dorsal sepal 4·3 mm. l., 1·5 mm br.;

laterals somewhat shorter. Petals 1·6 mm. l., ·7 mm. br. Lip 1·5 mm. l., nearly as broad. Column a little over 1 mm. l.

Hab.—On trunks of trees, between Newhaven Gap and Vinegar Hill, 4000 ft.; in fl. Feb., *Harris* !

A member of the section *Lepanthiformes*, near *P. roraimensis* Rolfe, which, however, is a larger plant, 4–5 cm. high with stems 1·5 cm. long and broader leaves.

Lepanthes elliptica. Herba parva caulibus folia elliptica excedentibus; vaginæ ut in *L. cochlearifolia.* Racemi 2—plurifasciculati vel solitarii quam folia breviores, floribus paucis, bracteolis ciliolatis demum glabratis. Sepalum posticum triangulari-ovatum breviter acuminatum, sepala lateralia postico similia $\frac{1}{3}$-connata. Petala subulata. Labellum ellipticum apiculatum.

Stem 1–3 cm. l., the large, spreading hirsute sheaths and stems are like those of *L. cochlearifolia.* Leaves 1–2 cm. l., ·5–1·1 cm. br., sessile, narrowing at base. Flowers crimson. Sepals crimson, 3·5 mm. l., the posterior slightly over 2 mm. br. The petals are only developed anteriorly into a subulate lobe reaching in bud to about the top of the anther. Lip small, simple, springing from the column. Column (without anther) 1 mm. l.

Hab.—On trunks of trees, 2700 ft., in fl. Sept., Holly Mount on Mt. Diabolo, 9894, 9895*a*, 9896, *Harris* !

Approaches *L. bilabiata* in its simple lip, but differs in its subulate petals, which are only developed anteriorly.

Lepanthes brevipetala. Herba parva caulibus folia anguste elliptica obtusa excedentibus; vaginæ ferrugineo-hirsutæ ore late aperto et apice acuto. Racemi sæpissime plures fasciculati quam folia sæpe paullo longiores, floribus pluribus inter minores. Sepala, posticum late ovatum obtusum concavum, lateralia subacuta breviter connata. Petala brevissima rotundato-ovata obtusa. Labellum magnum semicirculare cordatum concavum. Columna brevis. Capsula anguste tri-alata ellipsoidea.

Stems 3–7 cm. l., robust for the genus, sheaths large, spreading much like those of *L. cochlearifolia.* Leaves 2·5–4 cm. l., ·7–1 cm. br. Flowers crimson. Sepals, dorsal 1·4 mm. l., lateral 1·2 mm. l. Petals simple, ·3 mm. l. Lip simple, strongly 3-nerved, 1 mm. l., a little more than 1 mm. br. Column about ·5 mm. l. Capsule 4 mm. l.

Hab.—On trees, Silver Hill Woodland, 4000 ft., in fl. and fr., Dec., 7539, *Harris* !

Approaches *L. bilabiata* in its simple lip, which is remarkable in the genus for its relative size; distinguished from all other species by the small simple petals.

Lepanthes Harrisii. Herba parva caulibus folia elliptica excedentibus; vaginæ robustæ ore lato striisque hirtellæ ferrugineæ. Racemi pauciflori quam folia longiores, bracteolis acutis glabris. Sepalum posticum longe ovatum tri-nerve, sepala lateralia lanceolata uninervia $\frac{1}{2}$-connata. Petala brevia breviter elliptica apice rotundata. Labellum ovato-rotundatum subcordatum

apice rotundato fortiter trinerve. Columna brevis. Capsula ellipsoidea sex-carinata.

Stem 3–4 cm. l. Leaves, blade 15–20 mm. l., 7–9 mm. br. The flowers are less caducous than usual. Sepals dark crimson purple, 2·5 mm. l. Petals ·7 mm. l., like those of *L. brevipetala*, but twice as long. Lip 1·3 mm. l. Column ·5 mm. l.

Hab.—On trees, Holly Mount, Mt. Diabolo, 2600 ft., in fl. and fr., Feb., *Harris* !

Very near *L. brevipetala*, but is distinguished by the lateral sepals free nearly to the base, and the much larger very conspicuous lip.

Lepanthes arcuata. Herba parva caulibus folia elliptica vel rotundato-elliptica excedentibus, vaginæ ore striisque ciliolatæ. Racemi pluriflori fasciculati quam folia breviores, bracteolis breviter acutis glabrescentibus. Sepalum posticum ovato-lanceolatum acutum, sepala lateralia vix $\frac{1}{3}$-connata late ovata apiculata uninervia. Petala trilobata, lobis subæqualibus obtuse triangularibus. Labellum lobis lateralibus quam petala columnaque multo longioribus columnam amplectentibus lineari-lanceolatis subfalcatis, lobo medio minuto acuto. Columna brevis. Capsula obovata anguste sex-alata.

This species is near *L. tridentata*, but differs in the short column, and in other respects. Stem 1·5–2·5 cm. l. The leaves are variable, being sometimes narrowly elliptical, sometimes roundish-elliptical, 1·2–1·7 cm. l. Sepals magenta-crimson, dorsal 2·3 mm. l., lateral 2 mm. l. Petals brick-orange yellow; in breadth barely 1 mm., while those of *L. tridentata* are 1·5 mm. broad. Lip brick-orange yellow tinged with crimson, 1·5 mm. l., the lateral lobes nearly twice as long as the column, being 1 mm. l., whereas the lip of *L. tridentata* is just over 1 mm. l., the lateral lobes being barely 1 mm. l. The column is ·6 mm. l. as contrasted with that of *L. tridentata*, which is 1 mm. l.; it is of a rather lighter shade of magenta-crimson than the sepals. The anther is white.

Hab.—On trunks of trees, Holly Mount, Mt. Diabolo, 2600 ft., in fl. and fr., Feb., *Harris* !

Lepanthes Woodiana. Herba pusilla aut parva, caulibus quam folia elliptica sæpius longioribus; vaginæ acutissimæ ore striisque muriculatæ. Racemi pluriflori plures fasciculati quam folia breviores, bracteolæ acutiusculæ glabræ. Sepalum posticum late ovatum obtusum, sepala lateralia $\frac{1}{2}$-connata. Petala obverse deltoidea apice brevi obtusa. Labellum ut in *L. sanguinea*. Columna brevis superne dilatata.

Stems to 3·5 cm. l. Leaves subsessile, generally 8–14 mm. l. Sepals transparent yellow, dorsal 2 mm. l., lateral barely as long. Petals a deeper shade of yellow than the sepals, shaded with crimson, slightly over 1 mm. br. Lip crimson, ·5 mm. l. Column deep pink. Anther-case white.

Hab.—On trunks of trees, Holly Mount, Mt. Diabolo, 2600 ft., in fl., Feb., *Harris* !

The specific name is given in honour of Miss H. A. Wood, who has made drawings of most of the Jamaica orchids for the Herbarium of the Botanical Department, Jamaica.

Very near *L. sanguinea*, but distinguished by absence of cilia on the sepals and petals, the shape of the petals, and the colour of the flowers.

Microstylis integra. Caulis basi incrassatus inferne 2-foliatus basi vagina vestitus. Folia elliptica obtusa basi in petiolum vaginantem contracta. Racemus elongatus floribus dissitis. Flores inter minores pedicellati. Bracteæ lineari-lanceolatæ pedicellis multo breviores. Sepala ovato-oblonga obtusa margine revoluta. Petala linearia sepalis vix æquilonga. Labellum ovatum auriculatum integrum obtusum auriculis rotundato-ellipticis. Capsula ellipsoidea versus basim paullo angustata.

Herb 15–30 cm. high. Leaves generally 3–5 cm. l., 1·5-2·5 cm. br. Sheath 2 cm. l. Raceme 3–8 cm. l. Pedicels 4–5 mm. l. Bracts 2 mm. l. Sepals 2·2 mm. l., 1·5 mm. br. Petals 2 mm. l. Lip 2·5 mm. l., 2 mm. br. Capsule 6 mm. l.

Hab.—On rocky banks, Guava Ridge Road, 2500 ft., in fl. and fr., Nov., 7735, 7741, *Harris*!

Near *M. spicata* Lindl., but distinguished by the entire lip.

Microstylis Grisebachiana. Cormus parvus sphæricus. Caulis infra medium vel basim versus 1-foliatus, basi vaginis 1–2 vestitus. Folia elliptica vel ovato-elliptica obtusa subcordata petiolo vaginante. Racemus oblongus floribus versus apicem congestis. Flores inter minores pedicellati. Bracteæ triangulares acuminatæ pedicellis multo breviores. Sepala ovato-oblonga obtusa margine revoluta. Petala linearia quam sepala breviora. Labellum subquadratum auriculatum superne 3-lobatum, lobo medio brevissimo dentiformi, auriculis rotundato-ellipticis.

Herb 11–22 cm. high. Corm 1–2 cm. Leaf 2·5–5 cm. l., 1·5–3 cm. br. Stem sheathed at base 1·5-3 cm. Raceme 3–4 cm. l. Pedicels 6–8 mm. l. Bracts barely 2 mm. l. Flowers yellowish green. Sepals, dorsal about 2 mm. l., ·6 mm. br., lateral slightly shorter. Petals 1·5 mm. l. Lip 2·25 mm. l., 1·75 mm. br., lateral lobes ·6 mm. l., middle lobe ·25 mm. l., auricles ·5 mm. l.

Hab.—On damp clayey shady banks, in fl., Oct.-Dec., Cinchona, 4920-5000 ft., 7744, 9790, 9792; Morse's Gap, 4800 ft., 7743, *Harris*! 230 (in part), *Morris*!

Near *M. spicata* Lindl., but at once distinguished by the single leaf.

Liparis Harrisii. Caulis demum pseudobulbosus duobus vaginis papyraceis sublaxiter tectus. Folia duo ovali-elliptica abrupte acuta petiolo longius vaginante. Scapus tri-alatus, racemis floribus magnis laxis. Bracteæ lanceolatæ uninerves pedicellis duplo breviores. Sepala linearia acuminata. Petala filiformia. Labellum ellipticum obtusum cordatum venis in medio elevatis basi in callos geminos convergentibus. Columna gracilis arcuata sub anthera et basi dilatata. Capsula ellipsoidea basi angustata.

Pseudobulb in fruiting specimen 2·5 cm. l., 8 mm. br. Leaves,

blade of upper leaf 7–12 cm. l., 4–6·5 cm. br. Scape 7–13 cm. l. Raceme 2–5·5 cm. l. Flowers usually from 15 to 10. Bracts 4–5 mm. l. Pedicels without ovary 8–10 mm. l. Sepals 9 mm. l., 2·5 mm. br., greenish margined with purple. Petals equal in length to sepals, purplish. Lip 13 mm. l., 8·5 mm. br., greenish, veined and tinged with purple or brown. Column 4·5 mm. l., greenish. Capsule 1·3 cm. l.

Hab.—In spongy peat and leaf-mould in damp, shady places, in fl. and fr., Oct.–Dec., near John Crow Peak, 5500 ft., 7737; John Crow Peak, 6000 ft., 9786; wooded eastern slope of John Crow Peak, 5300 ft., 9795; *Harris*!

Allied to *L. Saundersiana* Reichenb. f., but a larger plant with evident stem and leaves and flowers twice as large.

BRECON AND WEST YORKSHIRE HAWKWEEDS.

By the Rev. Augustin Ley, M.A.

I have been asked by Dr. F. Arnold Lees to contribute a list of hawkweeds for a reissue of the *West Yorkshire Flora*; and I take the opportunity of publishing this list in a somewhat abridged form, side by side with a similar list for the county of Brecon, in this Journal. It is hoped that the comparison of two districts, both known to be rich in these plants, may make the lists of sufficient interest to the readers of the Journal; and that a place may also be obtained where several forms, previously undescribed or unknown as British plants, may properly find publication. These have all been studied and watched for a series of years, so that no advantage appears likely to be gained by postponing their publication. In venturing to publish them, I have the advantage of manuscript notes communicated by Amand. Dahlstedt to the late lamented W. R. Linton in 1907: and I am encouraged by knowing that Mr. Linton himself, had he lived, would shortly have published most of them. Except in a few instances, wherever the nomenclature of the *London Catalogue*, ed. x., has been departed from, it has been done with a view to carry out the latest decisions of one or both of these two great hawkweed authorities. I hope that a similar paper may shortly be undertaken for some Scottish forms of the genus by a botanist possessing the requisite knowledge, and that I may have the opportunity of publishing notes on some forms found in the English Lakeland.

The present paper is limited to two districts with which I can claim better acquaintance. With regard to West Yorkshire my experience is strictly limited to the Settle district, including Upper Ribblesdale, the Ingleton district, and the heads of Wharfedale, gained in summer holidays of no great duration in 1900 and four subsequent years in company with W. R. Linton, in which flying visits were also paid to Dent Dale and the Rothay Valley above Sedbergh. With Breconshire I have a more thorough acquain-

tance, extending over a long series of years. But Yorkshire has had the advantage of the scrutiny of numerous botanists of first-rate ability through a long period, and their observations have more than compensated for my own shortcomings. It is only necessary to mention the names of the elder Backhouse and J. G. Baker to show this; but I also wish to mention Messrs. T. A. Cotton, Handley, F. A. Lees, Mennell, J. A. Watson, Wheldon, A. Wilson, and last, but not least, F. J. Hanbury, many of whose plants I have studied in Mr. Hanbury's collections, and incorporated in the following lists. Where no name is mentioned, I am myself responsible for the record.

In addition to W. R. Linton, without whom I could not have attempted this paper, I wish to acknowledge the kindness of Rev. E. F. Linton; of Mr. F. J. Hanbury in allowing his great herbarium to be consulted; and the ungrudging assistance of the late Miss Rachel F. Thompson, whose knowledge of the hawkweeds of her home at Settle was for many years unequalled.

For the purposes of this paper the county of Brecon has been divided into four districts corresponding with the four outstanding blocks of hills which occupy its area. These districts are:—I. Black Mountain; II. Brecon Beacons; III. Mynydd Epynt; IV. Yrfon and Towy Hills. The Yorkshire records fall mainly into three sections:—1. Ribblesdale from Settle northwards, including Clapham and the southern slopes of Ingleborough; 2. Ingleton, including the northern slopes of Ingleborough, Dent Dale, and Sedbergh; 3. Upper Wharfedale, with its two branches distinguished by their principal villages, Arncliffe and Kettlewell. These divisions are indicated in the paper by the Roman numerals I, II, III, and IV in the case of Brecon, and by the Arabic 1, 2, and 3 in the case of Yorks.

H. Pilosella L. Type abundant both in Brecon and Yorks.

Var. *nigrescens* Fr. Rather rare, often on walls. II. Wall-top under Craig Rhiwarth, Cellwen. 1. Railway-side at Selside, Ribblesdale.

Var. *concinnatum* F. J. Hanb. Common; passing into the type by numerous gradations. I. Mountain side under Taren-'r-Esgob. II. Railway-bank at Sennibridge. 1. Langcliffe, Ribblesdale. 2. Jenkin's Beck, Ingleton.

H. anglicum Fr. Absent from Brecon. Common throughout the Yorkshire area, both on the scaurs and in the glens. Forms with spotted leaves, not otherwise differing from type, occur principally in the river glens.

Var. *acutifolium* Backh. Rare. 2. Chapel-le-Dale, well-marked. High slate cliff, Ingleborough, between type and this.

Var. *calcaratum* Linton. Rare. 1. Moughton Scaurs. 2. Ingleborough Scaurs.

Var. *brigantum* F. J. Hanb. Rather rare. 1. Moughton and other scaurs near Clapham. Smearsett and Feizor. 3. Hestleton Glen and Buckden, Wharfedale.

Anglicum × *hypochæroides*, type? 1. Moughton Scaurs.

Anglicum × *hypochæroides* var. *lancifolium*. 1. Catterick Glen, Settle. 3. Blue Scaur, Arncliffe.

[*H. flocculosum* Back. has often been reported from West Yorks; all the specimens, however, which I have seen are to be attributed to a flocculose form of *H. anglicum* Fr.]

H. IRICUM Fr. Very rare. 1. Malham; Mr. J. G. Baker, Lees's *Flora of West Yorkshire*. Not seen by me.

H. LEYI F. J. Hanb. Absent from Brecon; the plants attributed to this proving to belong to *H. Schmidtii* Tausch var. *eustomon* Linton. Yorks, very rare. 2. Cauntley Spout, Sedbergh, on the slate.

H. decolor, sp. nov. *H. cæsium* Fr. var. *decolor* Linton Brit. Hier. p. 59. Widely spread in Yorks on the limestone scaurs; absent from Brecon. 1. Giggleswick, Feizor, Smearsett, Gordale, and Stackhouse Scaurs, near Settle; *Miss Thompson, Hanbury*! 2. Ingleborough, Twistleton, Keld Head, and other scaurs near Ingleton. 3. Hestleton Glen.

Dahlstedt remarks (*in litt.* 1907) upon specimens of this plant from the Orme's Head, submitted to him by Rev. W. R. Linton: "Not *H. cæsium* Fr., but perhaps belonging to the *Oreadea* group." This criticism is amply justified by the setiform hairs of the leaves, and the deeply toothed and longly ciliate margins of the receptacle-pits, and it applies equally to the Yorkshire and to the Carnarvonshire plant. The heads are also larger and their glands stronger than in the plants falling under *H. cæsium* Fr. Some of the Yorks plants were at one time placed under *H. Leyi* F. J. Hanb.

H. SCHMIDTII Tausch. Rare in both counties. II. Dyffryn Crawnon, *teste* W. R. Linton, on limestone. 2. Slate cliff at the head of Ingleborough. Braidey Garth Scaur, Ingleton. Cauntley Spout, Sedbergh (slate).

Var. *eustomon* Linton. Brecon; very local. II. Abundant on Craig Gledsiau, Brecon Beacons; recurring at Fan Nedd. Not found elsewhere in Breconshire, but found in Carmarthenshire, on the Fan Fechan Cliff, and again westwards at Carreg Cennen Castle and near Llandebie. Issued in the "Sets," No. 129, as *H. Leyi* F. J. Hanb. Not in Yorks.

H. LASIOPHYLLUM Koch. Brecon, local; Yorks, very rare. II. Railway-side near Clydach, Crickhowell; *Riddelsdell*! Craig Rhiwarth, Cellwen, very abundantly. 1. Giggleswick Scaur, 1853; *Herb. Backhouse*! *Herb. Mus. Brit.*! I have seen only a few sheets of the wild plant, but specimens of the cultivated plant (gathered by Christie) have been distributed by Mr. Ar. Bennett through the Botanical Exchange Club labelled "*H. Gibsoni* Back. from Settle," which are certainly *H. lasiophyllum*, and probably from the same locality.

Var. *planifolium* F. J. Hanb. Brecon, very rare; absent from Yorks? II. Craig Cille, Crickhowell; Craig-y-Nos Ridge, Cellwen; both on limestone. This hawkweed occurs in the limestone districts of Derby (*W. R. Linton*!), and should be searched for in Yorks.

Var. *euryodon* F. J. Hanb. Rare in Brecon; absent from Yorks. I. Crickhowell Daren (sandstone). II. Craig Cille (limestone), Craig Gledsiau and Craig Du (sandstone), very fine.

H. RUBICUNDUM F. J. Hanb. Local in Brecon; rare in Yorks. I. Plentiful in the Black Mountain: Taren-'r-Esgob, Taren-llwyd. II. Dyffyrn Crawnon. 2. Black Force, Howghyll, Sedbergh; *A. Wilson*, 1892!

H. NITIDUM Backh. var. *siluriense* F. J. Hanb. Locally abundant in Brecon; absent from Yorks. II. Abundant on all the higher ridges of the Brecon Beacons, from Glyn Collwng westward to Craig Du. In the river glen and on a hedge-bank! at Nant Du on the Taf Fawr. Not yet found in Carmarthen, but occurring at Craig-y-llyn in Glamorgan, and in Merioneth (Llanwychllyn).

H. SOMERFELTII Lindeb. var. *splendens* F. J. Hanb. Yorks, very rare; not in Brecon. 2. High slate cliff, Ingleborough, 1902.

H. HYPOCHÆROIDES Gibs. Rare in Brecon; abundant in Yorks. II. Sparingly, but increasing, on limestone rocks and on a disused lime-kiln, Dyffryn Crawnon. 1, 2, and 3. The most abundant hawkweed on the limestone scaurs throughout the district.

Var. *lancifolium* W. R. Linton. Absent from Brecon; in Yorks less common than the type—on limestone rocks and in grassy limestone dales. 1. Crummack and Moughton Scaurs, near Clapham. 3. Hestleton Glen and Arncliffe.

Var. *saxorum* F. J. Hanb. Locally abundant in Brecon; rare in Yorks. II. On all the cliffs of the Brecon Beacons, from the central cliff westwards. Abundant at Fan Fechan, in Carmarthen; always on sandstone. 1. Rocks near Clapham. 2. Ingleborough scaurs above Dale Beck.

Var. *griseum* Ley. Brecon, very rare. II. On Craig Cille, Crickhowell, first in 1893. No other station yet known.

H. CYATHIS Ley. Locally abundant in Brecon; unknown in Yorks. II. Limestone rocks near Cefn Coed; Craig Cille, Craig Maillard—all on the limestone.

H. BRITANNICUM F. J. Hanb. var. *orale* Ley. Locally abundant in Brecon; scattered and nowhere abundant in Yorks. Cefn Coed (*Riddelsdell*!) and Craig Cille, abundantly. Queried as "*H. prolixum* Dahlst.?" in *Brit. Hier.* p. 40. 1. Smearsett and Feizor Scaurs. Clapham neighbourhood. Only on the limestone.

H. VAGENSE Ley. Brecon; local, and confined to a single district. Yorks; very rare. III. Rocky banks of the Wye from Llyswen northwards to about one mile above Erwood village; also along the corresponding distance on the Radnorshire bank. 1. Feizor Scaur, near Settle, 1902.

H. ORIMELES W. R. Linton. Brecon, rare; not in Yorks. II. Brecon Beacon Range, but confined to its western portion. Fan Nedd; Fan Gihirach; rocks above Cellwen—all sandstone. Abundant in Carmarthen at Fan Fechan.

H. SCOTICUM F. J. Hanb. Brecon, rare; Yorks, rare. II. Western portion of the Brecon Beacons. Fan Nedd, on sandstone. Penwyllt, on a limestone rock. Glyn Collwng, 1908. Rocks above

Llyn Fan Fawr (sandstone). Also at Fan Fechan, Carmarthen. 3. Deepdale, Upper Wharfedale; *T. A. Cotton*, 1892!

H. SANGUINEUM Ley. Brecon, very local; Yorks scattered and not common. II. Craig Cille and Dyffryn Crawnon, on limestone; central cliff of the Beacons, on sandstone. 1. Ingleborough, near Clapham; cliffs of Penyghent. 2. Twistleton and other scaurs near Ingleton.

H. STENOLEPIS Lindeb. Type: Brecon, rare. II. Craig Du, in the Senni Valley, 1893, on sandstone.

Var. *anguinum* W. R. Linton. Brecon, very rare. Undoubted specimens of this plant were gathered on Craig Gledsiau (II) in 1902, and at Fan Fechan, in Carmarthen, in the same year by Rev. H. J. Riddelsdell, and by myself at the latter station in 1905.

Var. SUBBRITANNICUM, nov. var. Resembling *H. britannicum* F. J. Hanb. Leaves shorter and firmer than in the type, with large retrorse teeth at the truncate base, deeper green. Heads large, truncate-based, dark-coloured; phyllaries *considerably less attenuate*. Name suggested by W. R. Linton. Exposed limestone rocks; more common than the type throughout Britain. Localities:—*West Gloucester*: Pen Moel Cliffs, near Chepstow; *W. A. Shoolbred*! Symonds Yat. *Hereford*: Great Doward Hill. *Brecon*: II. Craig Cille, and on rocks eastward towards Clydach; Craig-y-Nos, Cellwen. *Carmarthen*: Limestone cliff and old walls, Carreg Cennen Castle. *Carnarvon*: Great and Little Orme's Heads. No form of *H. stenolepis* appears to occur in Yorks.

H. SILVATICUM Gouan. Very rare in Brecon; many of its forms common in Yorks.

Var. *tricolor* W. R. Linton. Rare in Brecon; rather common in Yorks. II. Pwll Byffre, West Brecon, 1908 *f*. 1. Giggleswick and Clapham Scaurs. 2. Ingleborough and Twistleton Scaurs overlooking Dale Beck; Thornton Force, Ingleton. 3. Scaurs near Arncliffe and Kettlewell.

Var. *subcyaneum* W. R. Linton. Not yet found in Brecon; very abundant on the limestone scaurs, Yorks. This plant varies (*a*) with whitish floccose heads and livid style; (*b*) with darker, somewhat more glandular heads and livid style; (*c*) with rather dark and glandular heads and yellow style. 1. Feizor and Moughton Scaurs, &c. (*a* and *b*). 2. Braidey Garth and many other scaurs near Ingleton; Cauntley Spout, on slate (*a*). 3. Hestleton Glen (*a*); scaurs near Arncliffe and Kettlewell (*a*, *b*, and *c*). This hawkweed occurs at the Fan Fechan Cliff, Carmarthen, and will no doubt be found, if searched for, in Brecon.

Var. *asymmetricum* Ley. Very rare in Brecon; rather common in Yorks. II. Fan Nedd, 1906, 1908. 1. Giggleswick, Feizor, and Smearsett; on most of the scaurs near Clapham. 2. Ingleborough scaurs above Dale Beck. 3. Scaurs near Arncliffe and Kettlewell; Buckden. This plant runs down to forms much resembling var. *tricolor*. Typically, however, the plants are

very unlike each other, and they remain distinct in cultivation, and come true from seed.

Var. *micracladium* Dahlst. Absent from Brecon; fairly abundant in Yorks, always in the dales, not on scaurs. 1. Catterick Force, Ribblesdale. 2. Chapel-le-Dale, Beazley and Thornton Glens, Ingleton; Dent Dale, abundantly. 3. Arncliffe; Deep Dale, on the Upper Wharfe.

Var. *maculosum* Dahlst. On scaurs, very scarce. 2. Twistleton Scaur; *Hanbury*! Airton; *Hanbury*! Not in Brecon.

H. PELLUCIDUM Laestad. *H. pellucidum* var. *lucidulum* Ley *olim*. Abundant in both counties on mountain rocks, limestone, and sandstone; more rarely in river glens; very rare in the lowlands. I. Taren-'r-Esgob and Taren-llwyd in the Black Mountain. II. River glen at Clydach; *Riddelsdell*! On all the cliffs of the Beacon Range, from Craig Cille on the east to Craig Rhiwarth on the west. Taf Fechan Glen, Upper Tawe Glen. 1. Catterick and Ribblehead Glens. 2. Scaurs and glens near Ingleton. 3. Hestleton Glen, Arncliffe, and Kettlewell. Between Witton and Wemsley, North-west Yorks; *Wheldon*!

It appears that the plants we have been accustomed to call *H. pellucidum* Laestad. in Britain, and some of which have been so named by great Scandinavian authorities, are now mostly to be placed under *H. serratifrons* Almq., and that the very distinct plant we have been naming *lucidulum* Ley is the true *H. pellucidum* Laestad.

H. CANDELABRI W. R. Linton. Only in Yorks, on limestone scaurs, rare. 2. Ingleborough scaurs above Dale Beck. Teesdale, North Yorks; *Brit. Hier.* p. 44.

H. VARIICOLOR Dahlst. Only in Yorks, on the scaurs, and on riverside rocks, not common. 1. Clapham Fells, at Ingleborough Cave. 2. Chapel-le-Dale; Dent Dale, abundantly. 3. On the Upper Wharfe, at Deepdale.

H. CILIATUM Almq. Only in Yorks, on the scaurs and in river glens, widely distributed, but not abundant. 1. Clapham Fells. 2. Chapel-le-Dale and Thornton Force; George's, and other scaurs near Ingleton. 3. Hestleton Glen, Arncliffe; Buckden, on the Upper Wharfe; head of the Cover River; *W. R. Linton*! Aysgarth Force in Wensleydale, North-west Yorks; *Wheldon*!

H. repandum Ley. *H. ciliatum* var. *repandum* Ley; *Brit. Hier.* p. 45. Brecon, locally plentiful; not in Yorks. II. Cliffs, both of limestone and sandstone, from the central cliff of the Brecons westward to Craig-y-llyn Fawr. Very abundant on Craig Gledsiau and Craig Rhiwarth. Extending to the Fan Fechan, Carmarthen, and reappearing on the Carnedd Dafydd Cliff, Carnarvon (1891). I venture to give this plant specific rank in deference to the judgement of Dahlstedt, who writes (1907): "Not *H. ciliatum*; too much hair, too little gland."

Var. *venosum* Ley. *H. ciliatum* Almq. var. *venosum* Ley in *Journ. Bot.* 1907, p. 109. Brecon, very local. II. Craig-y-Nos Ridge, on the western borders of the county (limestone), at 1250 ft. Not

yet detected elsewhere. Clearly in its place as a variety of *H. repandum*.

H. SERRATIFRONS Almq. var. *Stenstræmii* Dahlst. Not found in Brecon; locally frequent in Yorks. 1. Ribblehead and Cam Glen; Moughton Scaurs, Clapham. 2. Ingleborough Scaurs and Thornton Force, Ingleton. 3. Hestleton Glen, Arncliffe and Kettlewell, and other places in Wharfedale.

Much confusion has prevailed with regard to *H. pellucidum* Laestad. and *H. serratifrons* Almq. var. *lepistoides* Johanss. and allied forms, due in great measure to the fact that British plants have been at different times wrongly named by Scandinavian authorities.

It appears that we have in Britain, in addition to the two above-mentioned plants, the following allied forms (Dahlst. *Bidr. t. Syd. Sver. Hier.* ii. 1893):—

H. GRANDIDENS Dahlst. Leaves broad, ± ovate at base, cordate-hastate, coarsely reverse-laciniate. Involucres rather thick, short; phyllaries rather narrow, linear-lanceolate, floccose on margin, but not on middle surface.

H. TORTICEPS Dahlst. Leaves narrow, lanceolate to ovate-lanceolate, acutely serrate dentate, acutely laciniate at base. Involucres narrow, often twisted ("contorta"). Phyllaries narrow, densely glandular, floccose on margin, the floccum also sprinkled over surface.

H. CRASSICEPS Dahlst. is described in *Brit. Hier.* p. 46, and differs from both the above in having the root-leaves entire or subentire, often shorter and more obtuse, and in the large thick heads.

All these forms have glabrous ligules, and styles yellow at first and becoming sublivescent. The colour of the heads appears to be full black in *crassiceps*, green or greenish brown in *lepistoides*, *grandidens*, and *cinderella*.

It is suggested by Dahlstedt that *H. cinderella* Ley should be placed as a variety under *H. torticeps* Dahlst.; it appears to me to be very close, at least in its leaves, to *H. grandidens* Dahlst. It had better be left as an independent variety under *H. serratifrons* Almq., characterized by the narrow cuneate-based heads, long, very narrow phyllaries, greatly exceeding the florets in bud, and exceeding pappus, longly senescent, and by the strongly ciliate ligules.

Much material belonging to one or other of these segregates has been named in Britain either *H. pellucidum* Laestad. or *H. lepistoides* Johanss. True *H. lepistoides* Johanss. appears to be rare in Britain.

H. GRANDIDENS Dahlst. I. Capel-y-ffin, in the Black Mountain. II. Tawe Glen, at Abercrave. III. Lane-side near Builth.

H. TORTICEPS Dahlst. II. Clydach Glen; *Riddelsdell*! Pontsticil, in Glyn Taf Fechan. III. Erwood, in the Wye Valley. Near Wetherby, Yorks; *Pickard*!

H. CRASSICEPS Dahlst. II. Aberclydach, Glyn Collwng, Dyffryn

Crawnon and Glyn Taf Fechan. Abercrave, in Glyn Tawe. III. Banks of the Wye at Llangoed.

H. CINDERELLA Ley. II. Head of Glyn Collwng.

Var. *caliginosum* Dahlst. Not in Brecon; Yorks, widely distributed on the scaurs and in the glens, but not abundant. 1. Crummack, near Clapham; Cam Glen and Ribblehead. 2. Ingleborough Scaurs and Chapel-le-Dale; Dent Dale, on slate. 3. Upper Wharfe, at Kettlewell and Buckden.

Var. *morulum* Dahlst. Brecon, on mountain rocks, rare; not known in Yorks. II. Craig Maillard, near Cefn Coed (limestone); Craig Du, Senni Valley (sandstone). Should be searched for in Yorks; found in Merioneth (Cwm Croesor), Carnarvon (Snowdon), and Westmorland (Helvellyn).

H. SUBULATIDENS Dahlst. Brecon, very local; not in Yorks. I. Taren-'r-Esgob and Taren-llwyd, abundantly. II. Y-fan-big, Brecon Beacons.

Var. *cuneifrons* Ley. Brecon, local, on mountain cliffs and in the glens; not in Yorks. I. With the type at Taren-'r-Esgob and Taren-llwyd. II. Limestone quarry near Craig Cille, Crickhowell; Craig Gledsiau; rocks at the powder-mills, Pont-nedd-Fechan. Found also at Craig-y-llyn Fach, Glamorgan!

H. CREBRIDENS Dahlst. Not in Brecon; Yorks, on limestone scaurs and in the glens, not very common. 1. Catterick and Birkwith Glens, Ribblesdale. 2. Ingleborough and Twistleton Scaurs; Chapel-le-Dale and Beazley Glens, Ingleton. 3. Hestleton Glen and Craybeck, Upper Wharfe.

H. RUBIGINOSUM F. J. Hanb. Very rare in Brecon; abundant in Yorks, only on limestone? II. Dyffryn Crawnon, on limestone, about 1890; cultivated since that date. 1. Settle; *Miss Thompson*! Smearsett; *Hanbury*! Moughton Scaurs, Clapham. 2. Ingleborough Scaurs, and on all the scaurs near Ingleton. 3. Hestleton Glen and Kettlewell, Upper Wharfe.

H. HOLOPHYLLUM W. R. Linton, f. Brecon, very rare? Yorks, local and rare. II. Fan Nedd; rock under Fan Hir, Cellwen? 2. Riverside rocks, Dent Dale (slate). 3. Hestleton Glen and Cowside Beck, Arncliffe; Parkgill, Kettlewell. "Under cultivation the Yorks plant has inner root-leaves and stem-leaves dentate at base, and very glandular heads, and is therefore not *typical H. holophyllum*," W. R. Linton. The Brecon plant is similar.

H. PLATYPHYLLUM Ley. Locally common in Brecon on mountain rocks; very rare in Yorks. I. On all the Darens of the Black Mountain, abundantly. II. Craig Cille, Dan-y-graig and Dyffryn Crawnon, on limestone. Craig Gledsiau and other sandstone cliffs of the Beacons. Reappearing at Portland, Dorset; *Riddelsdell*, 1907! 3. Hestleton Glen, once seen.

H. RIVALE F. J. Hanb. Rare or very rare in both counties. II. Craig Gledsiau, 1902; *Riddelsdell*! Tan-yr-ogof, Cellwen, 1899. Also on the Fan Fechan Cliff, Carmarthen; *Riddelsdell*! 2. Chapel-le-Dale and Beazley Falls, Ingleton, 1902.

H. PETROCHARIS Linton. Mountain rocks; rare in Brecon, absent from Yorks? II. Head of Cwm Tarell, at one spot; first in 1888. Craig Gledsiau, but very scarce; also the same plant, I believe, at the Fan Fechan, Carmarthen.

H. CYMBIFOLIUM Purchas. Absent from Brecon; abundant in Yorks. On the limestone scaurs, more rare in the glens. 1. Feizor, Clapham, and Moughton Scaurs. 2. Ingleborough Scaurs, and on all the scaurs near Ingleton. Beazley and Chapel-le-Dale Glens. 3. Scaurs near Arncliffe; Whernside. Hestleton and Cray Glens. The Yorks plant is noted by Rev. W. R. Linton as differing from the type in having "leaves pale yellowish green, and ligules more strongly ciliate," *Brit. Hier.* p. 52.

A strongly marked and easily recognized species. In the central cavity of the round unopened bud it closely resembles *H. sanguineum* Ley.

H. SAGITTATUM Lindeb. var. *philanthrax* Dahlst. Not in Brecon. Yorks, not common, on grassy banks in glens; not on the scaurs. 1. Ribblehead. 2. Chapel-le-Dale. 3. Hestleton Glen. Park Gill, Cote Gill, Buckden Glen, and other places on the Upper Wharfe.

Var. *lanuginosum* Lönnr. Absent from Brecon; plentiful in Yorks. 1. Cam Glen and Ribblehead, plentiful. 2. Ingleborough and Twistleton Scaurs; many scaurs near Ingleton. 3. Hestleton Glen; Buckden and other places on the Upper Wharfe.

H. Lintoni, sp. nov. *H. sagittatum* Lindeb. var. *maculigerum* W. R. Linton, *Brit. Hier.* p. 53. Locally abundant in both counties. In Brecon, on mountain rocks, both of limestone and sandstone; in Yorks, abundant both on the scaurs and on grassy banks in glens. II. Craig Gledsiau, abundant; Craig Rhiwarth; abundant also at Fan Fechan, Carmarthen. 1. Settle, 1890; *Miss Thompson*! Giggleswick and Smearsett Scaurs, &c. 2. Ingleborough Scaurs. 3. Hestleton Glen, and on all the scaurs near Arncliffe and Kettlewell. Grassington.

This plant was submitted to Dahlstedt in 1907, and pronounced by him "not to belong to the *sagittatum* group of forms." I entirely assent to this criticism, as I believe did Rev. W. R. Linton; I have therefore ventured to rename it after the discoverer. The maculation of the leaf is variable in the Yorkshire plant, and is absent in the Welsh specimens. Set No. 91, the Settle specimen, issued as *H. rubiginosum* F. J. Hanb., is this plant.

H. SARCOPHYLLUM Stenstr. Brecon, very rare; also in Yorks, very rare. II. Craig Gledsiau, 1896; a good match with foreign type *H. sarcophyllum* received from J. Dörfler. 1. On wooded limestone rocks at Langcliffe, Ribblesdale.

Var. *expallidiforme* Dahlst. Yorks, rather frequent, on scaurs and in glens. 1. Catterick Glen and Longcliffe; Moughton. 2. Ingleborough and Twistleton Scaurs; slate rocks on the top of Ingleborough. 3. Arncliffe and Kettlewell.

Not yet detected in Brecon, but likely to be found there, since it occurs in the neighbourhood of Chepstow, both in Monmouth and West Gloucester; *Herb. Shoolbred*!

(To be concluded.)

NOTES ON THE FLORA OF SUSSEX.—III.*

By C. E. Salmon, F.L.S.

The receipt of numerous notes upon the plants of Sussex from various observers seems to justify the publication of this fresh batch of records.

The most interesting species mentioned are:—*Ulex Gallii*, *Rubus tereticaulis*, *Chrysosplenium alternifolium*, *Gentiana baltica*, *Atropa*, *Euphrasia borealis*, *Melittis*, *Ajuga Chamæpitys*, *Orchis hircina*, *Colchicum*, *Paris*, and *Carex chætophylla*.

The county seems to justify its reputation for being one of the most prolific in "aliens" (particularly amongst the *Cruciferæ* and *Leguminosæ*), the warm coast, sheltered by the Downs, harbouring many "casuals," some of which (*Brassica elongata*, *Rapistrum perenne*, *Bromus unioloides*, &c.) seem to be becoming persistent.

It will be noted that some more records are quoted from Cooper's *Botany of the County of Sussex* (1834), which are omitted in the new (1907) edition of Arnold's *Sussex Flora*; some of these localities are in the neighbourhood of Tunbridge Wells, as Harrison's Rocks, Penn's Rocks, and High Rocks; these are all in Sussex, although claimed for Kent in Hanbury and Marshall's Flora of that county (see *Osmunda*, *Hymenophyllum*, *Asplenium lanceolatum*, &c.).

The following list comprises the chief contributors to the present article:—

E.N.B.	Rev. E. N. Bloomfield.	E.G.	Dr. E. Gilbert.
H.G.B.	Rev. H.G. Billinghurst.	H.H.	H. Hemmings.
A.B.C.	Miss A. B. Cobbe.	T.H.	T. Hilton.
M.C.	Miss M. Cobbe.	J.H.A.J.	J. H. A. Jenner.
Cooper	Cooper's *Bot. of Sussex*.	W.E.N.	W. E. Nicholson.
D.	Mrs. Davy.	W.M.R.	Rev. W. M. Rogers.
E.E.	Rev. E. Ellman.	My own records have no initals.	

The sign ! after a locality indicates that I have either seen the plant growing there, or a satisfactory herbarium example. An asterisk is placed before the *name* of species or variety when such is believed to be a new record for either East or West Sussex; when placed before a *number* it indicates an additional district to those mentioned in Arnold's *Sussex Flora*, to which the numbers refer. Plants considered to be introduced are distinguished by the sign †.

The following botanists have kindly examined many of the more critical plants, and favoured me with their determinations:—Messrs. A. Bennett, James Groves, H. W. Pugsley, Revs. E. F. Linton, E. S. Marshall, and W. Moyle Rogers (*Rubi*).

Clematis Vitalba L. VI. Archer Wood, Battle, 1876; J.H.A.J. Noted in Hemsley's *Outlines* as "absent from East Rother" (*i.e.*, this district).

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* See Journ. Bot. 1901, 403; 1906, 8.

Thalictrum flavum L. II. Amberley Wild Brooks, 1907; T. H.

Ranunculus circinatus Sibth. I. Between Sidlesham and Pagham, 1901.

**R. heterophyllus* Weber. IV. Streat; T. H. An addition to East Sussex.

R. peltatus Schrank var. **truncatus* (Hiern). III. Pond, Pondbrow near the Dyke! 1906; T. H.

R. Baudotii Godr. III. Sheep Pond, Cissbury Hill! 1905; T. H.

R. lutarius Bouvet. IV. or V. In one spot, Battle, 1876; J. H. A. J.

R. sardous Crantz. VII. East Grinstead, 1902; J. E. Clark & H. F. Parsons.

R. parviflorus L. V. Common in a poor weedy arable field between Crowlink and Birling Gap, 1904; W. E. N.

[*Helleborus viridis* L. I. About Arundel Castle; Cooper. This is possibly an error, as recent observers have found *H. fœtidus* there in plenty, but no *viridis*. Mr. T. Hilton informs me that the three stations recorded for this plant in Journ. Bot. 1906, 10, all refer to the same locality.]

†*Eranthis hyemalis* Salisb. IV. Under trees, Combe Place, near Lewes, very abundant and known for very many years; D.

Castalia alba Wood. I. Redford Pond, abundant; H. G. B. VI. Powder Mill Ponds, Battle, 1876; J. H. A. J. Winchelsea, 1887; R. Paulson. Guestling Marshes; E. N. B.

Papaver hybridum L. III. Common about Brighton; T. H. IV. Seaford; M. C. V. About Beachy Head, 1892. Jevington, 1906.

P. somniferum L. var. **glabrum* Wats. III. Cultivated land, Standean, 1907; T. H.

Glaucium flavum Crantz. V. Chalk-pit above Willingdon, two and a half miles from the sea, 1906.

†*Corydalis lutea* DC. VI. Old walls, Beauport and Battle, 1876; J. H. A. J.

Fumaria Boræi Jord. III. Aldrington! 1904; T. H. IV. Cornfield, Ringmer! 1906; T. H.—Var. *serotina* Clavaud. IV. Railway-yard, Newhaven! 1906; E. E. & T. H. Fletching Common! 1906; M. C. VI. Allotments, Guestling! 1905; E. N. B. Mr. Pugsley says of the Fletching Common plant:—"This is a form connecting the variety with *F. muralis*, and possibly should be placed as a separate variety under the latter. It well illustrates the impossibility of specifically separating *Boræi* and *muralis*."

**F. Vaillantii* Lois. IV. Allotments, Seaford, scarce, 1906. New to Sussex.

F. parviflora Lam. *IV. Allotments, Seaford, plentiful, 1906.

†*Cheiranthus Cheiri* L. V. or VI. Old walls, Battle, naturalized, 1876; J. H. A. J.

Radicula Nasturtium-aquaticum Rendle & Britten var. **microphylla* Druce. IV. Barcombe! 1906; T. H.

R. sylvestris Druce. IV. In the Levels, Lewes; Cooper.

Arabis hirsuta Scop. var. *glabrata* Syme. III. Downs near Ditchling Beacon! 1900; T. H.

Cardamine amara L. VII. Harrison's Rocks, Tunbridge Wells; Cooper. Near Forest Row Station, 1903. Between Groombridge and Withyham, 1907.

C. bulbifera Crantz. II. By stream near Kingsfold; Eng. Bot. ed. 3. I saw it plentifully there in 1892. VI. Tidebrook, Wadhurst, 1895; E. H. Farr (Hb. York Philos. Soc.).

†*Alyssum incanum* L. IV. Near Lewes; Eng. Bot. ed. 3. By corn-mill, Newhaven railway station! 1904; T. H.

Erophila verna E. Meyer var. *stenocarpa* (Jord.). *II. Greatham! 1906; E. E. & T. H.

E. virescens Jord. *III. Race-hill, Brighton! 1905; T. H.

†*Hesperis matronalis* L. IV. Southover, near Lewes; Cooper. V. or VI. Battle, naturalized, 1876; J. H. A. J.

†*Sisymbrium pannonicum* Jacq. *IV. Brickfield, Plumpton! 1905; T. H.

*†*S. Loeselii* L. IV. Railway-yard, Newhaven! 1906; E. E. & T. H.

†*Camelina sativa* Crantz. III. Aldrington Wharf! 1904; T. H.

*†*Brassica elongata* Ehrh. III. Roedale, Brighton! 1903, and Race-hill, Brighton! 1906; T. H.

*†*Sinapis dissecta* Lag. III. Cultivated land, Saddlescombe! 1905; T. H.

†*Bunias orientalis* L. III. Sheepcote Valley, Brighton! 1902, and Wolstonbury Hill! 1903; T. H.

†*Eruca sativa* Lam. *IV. Railway-yard, Newhaven! 1904; T. H.

Diplotaxis muralis DC. I. Midhurst, 1903; A. J. Crosfield. V. Bexhill and Bo Peep; W. M. R. Roadside beyond Marina, St. Leonards, 1885; E. de Crespigny. — Var. *Babingtonii* Syme. *IV. Lewes! 1906; M. C.

D. tenuifolia DC. III. By the Dyke Road, Brighton, 1907; T. H.

†*Lepidium ruderale* L. V. Polegate, 1906.

Thlaspi arvense L. I. Bognor; M. C. III. Patcham; H. H. IV. Hamsey; H. H.

†*Isatis tinctoria* L. III. One plant, border of cultivated land, Wolstonbury Hill, Clayton! 1905; T. H.; again in 1906; Miss M. Robinson.

*†*Rapistrum perenne* All. III. Ruins of dairy, Black Rock, Brighton! 1903–5; E. E. & T. H.

†*R. orientale* DC. *V. Waste ground near the sea, Bexhill! 1904; M. C.

Viola hirta L. f. *lactiflora* Reichb. III. Chanctonbury Ring! 1900; and IV. Newmarket Hill! 1906; T. H.

**V. Foudrasi* Jord. IV. Newmarket Hill! 1905; T. H.

V. Riviniana Reichb. var. **nemorosa* Neum. III. Newtimber Hill! 1906; T. H.

Frankenia lævis L. III. Southwick and VI. On the rocks and by the shore, Hastings; Cooper.

Dianthus Armeria L. IV. Between Denton and Alciston, 1905; T. H.

Saponaria officinalis L. IV. On the left of the roadside leading from Newick to Barcombe; Cooper.—Var. *puberula* Wierzb. *I. Roadside near Midhurst, 1907; E. E. and T. H.

Silene anglica L. I. Pagham! 1903; M. C. Railway near Selham, 1902. II. North of Horsham, 1904; J. W. White. IV. Cornfields, Fletching! 1907; M. C.

S. dubia Herbich. In Journ. Bot. 1906, 12, I mentioned that this occurred in three places on the Downs near Brighton, but only gave one station; the other two are Stanmer Down, and north side of Baldsdean Valley. These three localities are miles apart. *IV. Downs near Blackcap, Lewes! 1906; J. T. Cowey (per W. E. N.).

S. noctiflora L. IV. Downs near Lewes Racecourse! 1906; W. E. N. V. Near the [old] Beachy Head Lighthouse! 1887; Hb. Mrs. Makovski.

Cerastium arvense L. III. Race-hill, Brighton and Withdean, plentiful; H. H.

C. tetrandrum Curt. VI. Hastings, 1834; S. Hailstone (Hb. York Philos. Soc.).

Stellaria neglecta Weihe var. *umbrosa* (Druce). IV. Hendle Wood, near Lewes; Eng. Bot. ed. 3. In the new edition of Arnold's *Flora* it erroneously states that this plant was unknown for Sussex before 1901.—Var. **decipiens* E. S. Marshall. III. Albourne! 1905; E. E. & T. H.

Arenaria serpyllifolia L. var. **viscidula* Roth. III. Shoreham Beach, 1906; and IV. Bank near edge of cliff, Rottingdean! 1908; T. H.

A. tenuifolia L. I. Chichester, 1820; Rev. J. Dalton (Hb. York Philos. Soc.).

Sagina maritima Don. I. West Wittering, 1902. V. Near Beachy Head; W. M. R. VI. Pett Level and Camber; Supp. i. to Nat. Hist. Hastings, 1883.—Var. **debilis* (Jord.). III. Kemptown, Brighton! 1903; T. H.

S. ciliata Fr. III. Preston Park, Brighton! 1902; and coast, Shoreham and Aldrington! 1907; T. H.

S. Reuteri Boiss. III. Preston Park, Brighton! 1906; T. H.

S. procumbens L. var. **spinosa* Gibs. I. Cracks of pavements, Arundel, 1905. III. Rottingdean! 1907; T. H.

Spergularia salina Presl. var. **media* Syme. III. Shoreham, 1907.

Montia fontana L. I. Between Linchmere and Fernhurst; W. M. R.

†*Tamarix gallica* L. VI. Cliff east of Hastings and west of the old town; Cooper. The plate in Eng. Bot. is drawn from a Hastings specimen (see Garry, Journ. Bot. Supp. 1903, 38, where Smith's remark, "Some say a gentleman's servant introduced it from the French coast in the last century" is quoted).

Hypericum Androsæmum L. I. Near Stedham Mill and in lane from Holder Hill to Hardel's Green; H. G. B.

†*Malva pusilla* Sm. III. Cultivated land near Stanmer! 1904; T. H.

Linum angustifolium Huds. III. Goatherd's Green, Hurstpierpoint; V. Standard Hill, Ninfield; and VI. Bodiham Castle; Cooper.

*†*Geranium versicolor* L. VII. Roadside waste near Crawley Down, 1904; W. E. N.

G. columbinum L. III. Withdean; H. H. V. Downs near Jevington, abundant! 1907; M. C.

Rhamnus catharticus L. I. Woods at the back of the Linch Ball; H. G. B. III. Clayton; H. H.

R. Frangula L. VI. Darvel Hole and Dallington Common; H. Friend.

Acer campestre L. var. **leiocarpon* Wallr. III. Wolstonbury Hill, Clayton! 1905; T. H.

Ulex Gallii Planch. *IV. Terrible Down! 1904; W. B. Alexander.

Ononis spinosa L. I. Between the farm and Lynch Ball; H. G. B. II. With pure white flowers in damp pastures near Rudgwick; J. W. White. VI. Not seen in Hastings district; E. N. B. VII. Between Faygate and Bewbush Mill, 1902.

Trigonella ornithopodioides DC. III. Shoreham; Cooper.

*†*Medicago tribuloides* Desr. III. Plentiful at Shoreham, growing with *Trifolium stellatum* and *Vicia lutea*, 1905.

†*Melilotus alba* Desr. *II. Littlehampton! 1889; Hb. Mrs. Makovski.

*†*M. sulcata* Desv. III. Aldrington Wharf! and cultivated land, Race-hill, Brighton! 1902; T. H.

Trifolium arvense L. II. Storrington and Chiltington Commons; M. C.

T. scabrum L. VI. Shore near Hastings; Cooper.

*†*T. strictum* L. III. Roadside, Aldrington! 1902; T. H.

†*T. agrarium* L. III. Roedean Road, Brighton, 1904; T. H.

Anthyllis Vulneraria L. var. *coccinea* L. III. Downs near Brighton; J. H. A. J.

Lotus tenuis W. & K. IV. Fields near Cuckfield; D. VI. St. Helen's, Hastings; E. N. B.

*†*Coronilla varia* L. III. Ruins of dairy, east of Brighton! 1905; T. H.

Ornithopus perpusillus L. VI. Guestling, on sandrock; E. N. B.

Vicia tetrasperma Moench var. *tenuissima* Fr. *IV. Roadside near Ringmer! 1906; T. H.

V. gracilis Lois. *IV. Damp gravelly field, Cuckfield! 1907; Mrs. J. Pearson.

V. Cracca L. var. **argentea* C. & G. III. Saddlescombe! 1905; T. H.

†*V. villosa* Roth. III. Henfield, among vetches! 1904; T. H.

*†*V. atropurpurea* Desf. and *†*V. narbonensis* L. var. *serratifolia* Jacq. III. Aldrington, among vetches! 1905; E. E. and T. H.

†*V. bithynica* L. III. Cultivated land, Henfield! 1903; E. E. and T. H.

*†*V. Lens* C. & G. III. Near Saddlescombe, among vetches! 1905; T. H.

*†*Pisum arvense* L. III. Aldrington, among vetches! 1905; T. H.

Lathyrus Nissolia L. III. Hurstpierpoint, 1820; J. Dalton

(Hb. York Philos. Soc.). VI. Sedlescombe, 1876; J. H. A. J. Old Roar, Ore, 1877; R. L. Hawkins.

L. sylvestris L. I. Near the South Gate, Chichester; Cooper.

L. maritimus Bigel. VI. Rye; Cooper.

*†*L. sphæricus* Retz. and *†*L. annuus* L. III. Aldrington, among vetches! 1905; E. E. and T. H.

Prunus avium L. V. or VI. Battle, local, 1876; J. H. A. J. VI. Sedlescombe; H. Friend.

P. Cerasus L. V. or VI. Hedges, Battle, local, 1876; J. H. A. J.

Rubus plicatus Wh. & N. I. Aldworth, Blackdown; W. M. R. VI. Waterdown Lane, near Tunbridge Wells, 1902; W. M. R. and E. G.

R. holerythros Focke. I. Ambersham, 1907; T. H. VII. Worth Forest; C. E. Britton.

**R. imbricatus* Hort. V. St. Leonards and Bexhill, East Sussex; W. M. R. VI. Waterdown Lane, near Tunbridge Wells, 1902; W. M. R. and E. G.

R. carpinifolius Wh. & N. I. Midhurst Common; W. M. R.

R. argenteus Wh. & N. III. Race-hill, Brighton! 1905; T. H. VI. Waterdown Lane, near Tunbridge Wells, 1902; W. M. R. and E. G. VII. Worth Forest; C. E. Britton.

R. rhamnifolius Wh. & N. VI. Waterdown Lane, near Tunbridge Wells, 1902; W. M. R. and E. G.

R. dumnoniensis Bab. V. St. Leonards; W. M. R. Hurstmonceaux; G. C. Druce. VI. Waterdown Lane, near Tunbridge Wells, 1902; W. M. R. and E. G.

R. pulcherrimus Neum. *V. Bexhill; W. M. R. VI. Waterdown Lane, near Tunbridge Wells, 1902; W. M. R. and E. G.

R. villicaulis Koehl. var. **calvatus* Blox. I. Midhurst Common; W. M. R. IV. The Alders, Cooksbridge, 1906; T. H. *V. St. Leonards; W. M. R.

**R. rhombifolius* Weihe. IV. Lane from Streat to Plumpton Green! 1905; T. H. "Stem more hairy than usual, and panicle-prickles rather exceptionally curved," W. M. R.

R. leucandrus Focke. I. Burton; W. M. R.

**R. Godroni* Lec. & Lam. I. Aldworth, Shottermill Common, Linchmere Common, and Popple Hill, Lavington; W. M. R. *IV. Balcombe Road, Haywards Heath! 1904; R. S. Standen. VI. Waterdown Lane, near Tunbridge Wells, 1902; W. M. R. and E. G.: and also the var. *robustus* (P. J. Muell.).

R. pubescens Weihe var. *subinermis* Rogers. IV. Road from Streat to Plumpton Green! 1905; T. H. *V. Bexhill; W. M. R. V. or VI. Battle; W. M. R. VI. Waterdown Lane, near Tunbridge Wells, 1902; W. M. R. and E. G. VII. Worth Forest; C. E. Britton.

R. lentiginosus Lees. I. Heyshott Common; W. M. R. VI. Waterdown Lane, near Tunbridge Wells, 1902; W. M. R. and E. G.

R. hypoleucus Lefv. & Muell. IV. Chailey Common! 1906; T. H. "I believe you are right in putting this under this species, though the pieces are less glandular than usual," W. M. R.

R. hirtifolius Muell. & Wirtg. var. **danicus* (Focke). IV. Chailey Common, 1906; T. H. "A form with more crowded acicular prickles on the ped. than in Focke's type, and so far a slight step towards my *mollissimus*," W. M. R.

R. pyramidalis Kalt. I. Lamb Lea, Linchmere Common, and Aldworth; W. M. R.

R. leucostachys Sm. VI. Waterdown Lane, near Tunbridge Wells, 1902; W. M. R. and E. G.

R. lasioclados Focke var. *angustifolius* Rogers. I. Aldworth, Petworth, Coates, and Shottermill Common; W. M. R.

**R. Borœanus* Genev, II. St. Leonards Forest, 1907; J. W. White.

R. anglosaxonicus Gelert. *I. Aldworth; W. M. R.

R. infestus Weihe. VI. Waterdown Lane, near Tunbridge Wells, 1902; W. M. R. and E. G.

R. radula Weihe var. **echinatoides* Rogers. I. Lavington, in one place; W. M. R. V. Near St. Leonards, in great quantity: a form going off towards *R. Griffithianus*; W. M. R.

R. oigoclados M. & L. var. *Newbouldii* Rogers non Bab. VI. Waterdown Lane, near Tunbridge Wells, 1902; W. M. R. and E. G.

R. Babingtonii Bell Salt. I. Fittleworth to Petworth; W. M. R. *V. St. Leonards; W. M. R. V. or VI. Battle; W. M. R. VI. Waterdown Lane, near Tunbridge Wells, 1902; W. M. R. and E. G.

R. mutabilis Genev. var. *Naldretti* J. W. White. II. Between West Chiltington, Thakeham, and Storrington; J. W. White.

R. fuscus Wh. & N. VI. Waterdown Lane, near Tunbridge Wells, 1902; W. M. R. and E. G.

R. pallidus Wh. & N. I. Near Petworth Railway Station; W. M. R. V. Hurstmonceaux; G. C. Druce. — Var. *leptopetalus* Rogers. *III. Wood, Henfield! 1905; T. H.

R. thyrsiger Bab. VI. Road to Tunbridge Wells Cemetery; E. G.

R. foliosus Wh. & N. VI. Waterdown Lane, near Tunbridge Wells, 1902; W. M. R. and E. G.

R. rosaceus Wh. & N. I. Aldworth and East Dene Wood; W. M. R. II. Hedge, Hurst Road, Horsham, 1891; J. W. White. VI. Waterdown Lane, near Tunbridge Wells, 1902; W. M. R. and E. G. — Var. *infecundus* Rogers. I. Lamb Lea and Burton; W. M. R.—Var. *adornatus* (P. J. Muell.). *IV. Wood south of Chailey Station; T. H.

**R. dasyphyllus* Rogers. I. Lamb Lea; W. M. R.

R. Marshalli F. & R. VI. Waterdown Lane, near Tunbridge Wells, 1902; W. M. R. and E. G.

R. horridicaulis P. J. Muell. II. Near Pease Pottage, St. Leonards Forest! 1898; J. W. White (see Journ. Bot, 1906, 60).

**R. divexiramus* P. J. Muell. I. Ambersham Common, 1907; T. H. "My conclusion (?) is, put your plant *provisionally* to *R. divexiramus*," W. M. R.

R. hirtus W. & K. f. **minutiflorus* (P. J. Muell.). I. Wood east of Cocking, 1907; T. H. "I think a very weak form or state

of *R. minutiflorus*," W. M. R. Cowdray Park! 1907; T. H. "Must go, I think, to this," W. M. R.

**R. tereticaulis* P. J. Muell. IV. Wood south of Chailey Railway Station! 1906; T. H. "An interesting plant, undoubtedly allied to *R. hirtus* W. & K., but I think nearer still to *R. tereticaulis* P. J. Muell., under which you may provisionally place it," W. M. R.

R. dumetorum Wh. & N. III. Dyke Downs! 1905; T. H. IV. Roadside, Ringmer, 1906; T. H.—Var. *ferox* Weihe. *I. East Dene Wood and Lamb Lea; W. M. R. *V. Bexhill; W. M. R. VI. Waterdown Lane, near Tunbridge Wells, 1902; W. M. R. and E. G.—Var. *diversifolius* (Lindl.). V. Bexhill and St. Leonards; W. M. R. *VI. Etchingham; W. M. R.

R. corylifolius Sm. var. *sublustris* (Lees). *V. Bexhill; W. M. R.

Potentilla palustris Scop. II. Nyetimber Common, near West Chiltington; H. G. B. IV. By brook near Piltdown! 1906; A. B. C.

Agrimonia odorata Mill. IV. By a brook, Fletching Common! 1906; M. C.

Rosa Eglanteria Huds. V. Downs near Jevington! 1907; M. C.

R. arvensis Huds. var. *bibracteata* Bast. III. About Henfield; Eng. Bot. ed. 3.

Pyrus torminalis Ehrh. I. Goodwood and about Arundel; J. C. Loudon in Gard. Mag. v. 583, 1829. VI. Hawkhurst and Darvel Hole; H. Friend.

P. communis L. IV. Chalk above Plumpton; E. E.

P. Malus L. var. *mitis* Wallr. *VI. Winchelsea! 1900; H. F. Parsons.

P. germanica Hook. fil. VI. Frequent between Netherfield and Darvel Hole; H. Friend.

Cratægus monogyna Jacq. var. **laciniata* Wallr. II. By Slinfold Mill, 1891; J. W. White.

C. oxyacanthoides Thuill. *VII. Forest Row! 1899; H. F. Parsons.

*†*Cotoneaster microphylla* Wall. III. Large patch, embankment of Dyke Railway, Hangleton! 1906; E. E. and T. H.

Chrysosplenium oppositifolium L. III. Clayton; H. H. IV. Plentiful about Cuckfield; D.

**C. alternifolium* L. VII. Between Groombridge and Withyham! 1907; W. E. N. A most welcome addition to the Sussex flora; it occurs in all the adjoining counties.

Ribes nigrum L. IV. By stream, Copyhold, Cuckfield, right away from houses; D. V. or VI. Rare, borders of woods, Battle, 1876; J. H. A. J.

Sedum Telephium L. IV. Copyhold, Cuckfield; D. VI. Icklesham, 1887; R. Paulson. Guestling; E. N. B.

S. anglicum Huds. VI. On the beach or near it, Fairlight and Pett; E. N. B.

†*S. rupestre* L. III. A recent escape (in 1902) by Hassocks Station! H. H.

Cotyledon Umbilicus-Veneris L. II. East Preston; D.

Drosera longifolia L. I. On the Common, Fittleworth, 1904; D. II. Washington Common; Cooper.

Myriophyllum verticillatum L. IV. Near Iford! 1893; H. H.

Peplis Portula L. VII. Between Forest Row and Colman's Hatch, 1902.

Lythrum Salicaria L. III. Shoreham, Bramber, and Henfield; H. H.

Epilobium angustifolium L. I. Aldworth, Blackdown; W.M.R. Moist banks, Arundel; Cooper. III. Railway mounds south of Pangdean; H. H. V. Ashburnham, 1876; J.H.A.J. VI. Beyham Abbey; Cooper.

E. roseum Schreb. II. Frequent about Storrington! 1903; A. B. C. IV. Stream, Copyhold, Cuckfield; D. Chelwood Common! 1906; M. C.

[*Bryonia dioica* Jacq. VI. Noted as "very rare in this division" by E. N. B. in Arnold's *Flora*; he now tells me that he has never seen it growing there, and that the only record he has is unreliable and probably a mistake.]

Smyrnium Olusatrum L. V. Pevensey; H. F. Parsons.

Bupleurum tenuissimum L. I. Selsey, 1809; J. Dalton (Hb. York Philos. Soc.). Chichester Channel below Fishbourne, 1901. III. Between Worthing and Lower Lancing; Cooper. V. Bopeep; Cooper. VI. Brook by Hastings Castle and Pett; Cooper.

Apium graveolens L. IV. By canal at Glynde; H. H. V. Between Willingdon and Polegate! 1907; M. C.

A. nodiflorum Reichb. fil. var. *pseudo-repens* Wats. *II. Amberley Wild Brooks! 1907; T. H.

A. inundatum Reichb. fil. IV. Plumpton; E. E.

Carum segetum Benth. & Hook. fil. III. Withdean, Brighton; H. H. V. St. Leonards; W. M. R. Low Cliffs, Bo-peep, 1886; E. de Crespigny.

Fœniculum vulgare Mill. VI. Behind the Croft, Hastings; H. Friend.

Crithmum maritimum L. I. Pagham; D. V. Galley Point, near Bexhill, 1907; G. Goode.

Œnanthe Lachenalii C. Gmel. V. Bulverhythe! 1907; M. C. VI. East of Rye, 1900.

Œ. aquatica Poir. VI. Guestling and Fairlight; E. N. B. VII. By Furnace Pond, near Cowden; H. F. Parsons.

Heracleum Sphondylium L. var. **angustifolium* Huds. III. Standean! 1905; T. H.

Caucalis nodosa Scop. III. Near Southwick; H. H.

*†*Bifora radians* M. B. III. Aldrington, among vetches! 1905; E. E. and T. H.

†*Lonicera Caprifolium* L. III. In a hedge near Piecombe, scarcely indigenous; Cooper. Possibly this is the same as the Clayton locality mentioned in Hemsley's *Outlines*; the two places are close together. *IV. In a plantation not far from garden, Coombe Place, near Lewes. None was seen *in* the garden; D.

Viburnum Opulus L. III. About Clayton; H. H.

Galium erectum Huds. IV. Copyhold, Cuckfield! 1908; D.

G. Mollugo L. var. **Bakeri* Syme. III. In turf, Withdean, Brighton! 1902; T. H.

G. uliginosum L. II. Storrington Common; M. C.

G. tricorne Stokes. IV. Near Lewes! 1843; Hb. R. Pryor. V. Field, foot of downs above Willingdon, 1906.

Valeriana sambucifolia Mikan. I. Arundel! 1903; T. H. III. Clappers Lane, Fulking! 1902; H. H.

V. dioica L. III. Poynings, 1905; Miss M. Robinson.

Valerianella dentata Poll. I. Railway near Selham, 1902.

*†*Dipsacus laciniatus* L. III. Field by Old Shoreham Road, Hove! 1905; T. H.

D. pilosus L. I. Bank of R. Rother, near Stedham, 1907; E. E. & T. H.

**Aster Linosyris* Bernh. III. A single specimen between Brighton and Shoreham; Eng. Bot. ed. 3.

†*Erigeron canadense* L. *IV. Railway-yard, Newhaven! 1905; T. H.

**Filago spathulata* Presl. III. By the Dyke Road! Brighton! 1905; T. H. IV. Telscombe! 1905; E. E. and T. H. Between Newhaven and Bishopstone! 1905; T. H. The two last localities are in East Sussex and new to that vice-county 14.

Gnaphalium sylvaticum L. V. or VI. Battle, local, 1876; J. H. A. J. VI. Guestling Wood and Fairlight; E. N. B.

Inula squarrosa Bernh. IV. Between Southerham and Glynde; H. H.

Achillea Ptarmica L. III. Ditchling Common; H. H.

*†*Anthemis tinctoria* L. VII. Waste ground, East Grinstead; D.

A. nobilis L. II. Rough quarried ground two miles north-east of Horsham; J. W. White.

Matricaria inodora L. var. *salina* Bab. III. Kingston Beach! 1907; T. H.

Tanacetum vulgare L. IV. By Ouse between Hamsey and Barcombe; H. H. V. Horeham; H. Friend.

†*Ambrosia artemisifolia* L. *I. Bognor! 1904; D.

Petasites ovatus Hill. V. In two places near Little Worsham Farm, between Crowhurst and Bexhill, 1895; E. S. Salmon.

Senecio sylvaticus L. I. Rogate; W. M. R. III. Abundant above Bevendean; H. H.

S. integrifolius Clairv. V. Between Cuckmere Haven and Crowlink, abundant, 1904; W. E. N. Coombe Hill, Jevington, 1906.

Arctium Newbouldii Ar. Benn. III. Newtimber Holt! 1906; T. H.

A. pubens Bab. III. Saddlescombe! 1905; Miss M. Robinson. "A small form of this or *pubens* × *minus*?" A. Bennett.

Cnicus acaulis Willd. var. **caulescens* Pers. VII. On the top of Balcombe Tunnel! 1908; D. This, I believe, is a *state* only, the plant producing a stem when growing amongst long grass, &c. Bab. Man. (ed. 9) says of *C. acaulis*, "Leaves . . . glabrous except . . . on the ribs beneath"; this has them quite hairy on both sides.

(To be concluded.)

WHAT IS *EPIPACTIS PURPURATA* Sm.?

By G. Claridge Druce, M.A., F.L.S.

The answer to this question which would be given by many British botanists is that it is an abnormal form of some British *Helleborine*; I believe it possible to give a more precise identification. My attention having been again drawn to its supposed parasitism, I have recently examined the original specimen in Sir J. E. Smith's herbarium at the Linnean Society, which was gathered by Dr. Abbot (author of the *Flora of Bedfordshire*) in June, 1807, and sent by him to Smith on November 22nd of that year, with the following letter:—"I have put in for your observation a specimen of some plant with the habit of *Serapias* found at the wood near Noris Farm in the parish of Leigh [Worcestershire] which is as much altered in colour [by drying], as the *Gnaphalium* [sent with it] is now what it was, this was of a beautiful red lilac all over and was certainly parasitical on the stump of a maple or hazel or some such tree: from the lovely incarnate with which the whole plant seemed to glow at first view I conceived it to be something perfectly new. . . ." This specimen is labelled by Smith *Epipactis purpurata*, the specific name being added in pencil at a subsequent period. This is undoubtedly the type of his species established in the *English Flora*, iv. 42 (1828), as he there refers to it as his "only specimen." I see no sign of abnormality other than its being young, as must be the case if this species is gathered in Britain in June, and at that time the bracts appear relatively much longer than they do in the mature plant. It is without doubt the plant called *Epipactis violacea* Boreau by Babington, and is the *Helleborine violacea* of my *List*. It is true that Mr. R. A. Pryor, whose critical ability was of a high order, appears to have taken a different view respecting Abbot's plant. Writing of *E. violacea* (*Journ. Bot.* 71, 1881), he says it "is, I believe, the plant of Forbes, badly figured, and with a very insufficient description in *E. B. Supp.* t. 2775. It has, of course, nothing to do with the *E. purpurata* of Smith, which, as sufficiently evident from the original specimen, was founded on a deformation in an immature state." I think Mr. Pryor may at the time he wrote have been more conversant with mature *violacea*, which is strikingly different from its juvenile condition, when its beautiful violet tint and its long bracts give quite a different facies to the plant.

Mr. Townsend (*Fl. Hants*, ed. 2, 642) makes the very pertinent suggestion that Goodyer's Hampshire plant, *Nidus avis flore et caule violaceo purpureo colore*, was this. His description (*Ger. emac.* 228) runs:—"This riseth vp with a stalke about nine inches high, with a few smal narrow sharpe pointed short skinny leaves, set without order, very little or nothing at all wrapping or inclosing the stalke; hauing a spike of floures like those of *Orobanche*, without tailes or leaues growing amongst them: which fallen, there succeed small seed-vessels. The lower part of the stalke within

the ground is not round like *Orobanche*, but slender or long, and of a yellowish white colour, with many small brittle roots growing vnderneath confusedley, wrapt or folded together like those of the common *Nidus avis*. The whole plant as it appeareth above ground, both stalkes, leaues, and floures, is of a violet or deepe purple colour."

The absence of bracts from the inflorescence is much against the plant being *violacea*; but the reference to the colour of the plant above ground, and to its underground growth are in favour of this conclusion. That it was not *Lathraea*, as suggested by Mr. Yalden, the date is sufficient to prove. Nor is there any corroboration of the plant being *Limodorum*, as suggested by Bobart (*Mor. Hist. Pl.* 503, 1699) and Hudson (*Fl. Angl.* 336). Smith (*Tr. Linn. Soc.* iv. 1764) thought it was *Orobanche cærulea*, but the description does not suggest an *Orobanche*.

The definite publication of *E. purpurata* dates from the *English Flora*, 1828; but it must also be borne in mind, as Mr. Pryor points out, that in Supplement to *Engl. Bot.* t. 2775 (1833), James Forbes, of Woburn, gives a figure and description which, although not particularly happy, leave no doubt that the same species is meant. The specimen was obtained from woods at Woburn Abbey, Beds, where I have seen it growing. He rightly describes the colour of the flower, and alludes to the colour of the plant. Mr. Britten kindly showed me in Ed. Forster's herbarium in Hb. Brit. Mus. a specimen of Forbes from Woburn Abbey, dated 1841, which appears to be this *E. purpurata*, although another specimen of Forbes from the same county is an abnormal barren plant.

The specific name *purpurata* has thus priority over that of *violacea*, the latter dating only from 1840. The name must therefore stand as:—

HELLEBORINE PURPURATA.

Epipactis purpurata Sm. Eng. Fl. iv. p. 41, 1828.
E. media Fr. var. *purpurata* Syme E. B. ed. 3, ix. p. 123.
E. violacea Boreau Fl. Centre, ii. 651 (1840).
Subsp. *E. purpurata* (Sm.) Hook. f. Student's Fl. 388 (1884).
Helleborine violacea Druce Dillen. Herb. 115, 1907.

As has been said, in this species the flowering-spike appears, if anything, earlier than its allies, *latifolia* and *media*, but the development is so slow that it is the latest to open its flowers. Their colour differs from our other species in showing little, if any, reddish tint. The whole plant, stem, and leaves are of a beautiful violet-purple, which, as the plant matures, is lessened in intensity. It is densely tufted, from four to nine stems rising from a single root. I owe to the kindness of Mr. and Mrs. Davy, of Copyhold, Sussex, in whose woods this plant grows in company with *H. latifolia* and *H. media*, a carefully exhumed root from the chalky subsoil, which is compactly branched and contorted, and is in close association with roots of hazel; but in no case is there trace on them of haustoria, or indeed does there seem more than accidental contact with other roots. There is present, however,

a considerable amount of mycorrhiza, and it is probably through this medium that the nutrition from humus and its derivatives is absorbed. From certain points on the root-system the flowering-stem arises, and year by year the tuft changed its position. The roots themselves are thickly covered with root-hairs. It is distinctly a sylvan species, and I have found it in woods with only a thin covering of humus over chalk, as well as in humus over glacial and Oxford clay, as well as on brick-earth and the tertiaries. It essentially differs from *Pedicularis* and *Rhinanthus*, which become distinctly attached to the roots of other species. Therefore we may negative Abbot's view of its supposed parasitism. In Whittlebury Forest, Northants, I once met with a tuft growing close to an oak, but on examination I found it was entirely distinct from the roots of any plant.

SHORT NOTES.

Weather and Plant Distribution.—It has long been known to botanists that plants change their stations locally when they have exhausted the soil constituents they require; on the other hand, the still greater influence that weather in the widest sense—a series of dry or wet summers—has on the flora of a wide district or vice-county is not so easily detected. The following short notes, selected at random from my store, will illustrate what I mean. *Anagallis arvensis* is a most widely distributed species, but H. C. Watson rightly characterized it as "a casual colonist," or, as I prefer to class it, as an extra-areal follower of cultivation. It is a most uncertain species, too. The wet seasons before 1893 practically exterminated it on the varying soils found in the watershed of Cadney Beck, Lincolnshire, which range from the stiffest clay, like Kimmeridge, to blown sand, peat, and their mixtures. Even in the dry season of 1893 the only plants I could find were on the freshwater alluvium of the dry beck, where they were undoubtedly "water-carried." I wrote in *The Naturalist*, 1894, p. 21: "It has come down from the head waters, as it is not found on any of the intermediate soils." Within two years it was common enough on tilth, broken ground, in shallow ditches, and by the edge of roadsides, all over the same watershed in the typical colour, and with many varying colour forms. Varying colour forms in some species, as in this instance, may be put down to sudden and rapid multiplication on a variety of soil. Another species which the wet seasons before 1893 depleted almost to the point of extermination in certain places was *Galium Aparine*. It is areal with us; and is destroyed by water or dew hanging persistently on the seeds and causing decay. Both species are truly "children of the sun." Dry weather, when prolonged season after season, tells equally on other species. *Rumex maritimus* is a good instance. If we have any areal species, this surely is one. Till the dry summer of 1893, it was recorded for eleven out of the eighteen botanical divisions of Lincolnshire. There can be little

doubt, too, that if the records before 1890 had been as full and exact as they have been since, that it would have been found in five of the remaining divisions, if not in all. Yet it has only been recorded once again this season since 1894 in a maritime division. It has quite gone from all the localities I and others could take it in formerly. This is one of the species which seem to be carried from place to place by ducks and waders in their movements from water to water—field ponds on sandy soils being no exceptions. Since the burning season of 1893 *Drosera anglica*, too, has not been observed in this county, though it has been regularly hunted for in its old habitats. I believe it has followed *Sonchus palustris*, *Senecio paludosus*, *S. palustris*, and *Vaccinium* for good. I almost began to fear that *Rumex maritimus* had, as an areal species.—E. A. Woodruffe-Peacock.

Euphrasia minima Jacq. in England.—In August last I found on Exmoor, Somerset, about a mile and a quarter from the Devon border, several specimens of a small *Euphrasia* having their corollas decidedly yellow; they grew in short turf on a stony soil. Mr. Hiern, to whom I sent specimens, suggested that they perhaps belonged to *E. minima* Jacq.; but he asked me to submit specimens and his suggestions to another authority, who suggested *E. curta* var. *glabrescens*. Three days after my discovery, Miss C. E. Larter found similar specimens about two miles from my station, and later Mr. Hiern also gathered some at a third station on Exmoor. The three Exmoor stations range between 1200 and 1400 ft. above the sea-level. I have submitted specimens to Dr. Wettstein, who, in reply, says he has thoroughly examined my specimens, and in his opinion the Exmoor plant belongs to *E. minima* Jacq., but is an English form of that species: "Ich möchte ihre Planzen mit Sicherheit als *E. minima* bezeichnen."—Helen Saunders.

Allium oleraceum L. in Ireland.—For many years I have been acquainted with a species of *Allium* growing along the Sixmilewater River, above Antrim. *A. vineale* L. had been previously recorded from the same locality, but I could never make my specimens square with the description of that species. To settle the point I dug up some of the bulbs, planted them in my garden at Dublin, and watched all stages of their development. I came to the conclusion that the species was *A. oleraceum* L., and my opinion has been confirmed at the Department of Botany of the British Museum. There is no previous record of the occurrence of this species in Ireland. Its actual distribution in its present habitat at Antrim requires to be more fully worked out, but I found it in several spots on both sides of the river for a distance of about half a mile. I hope to show in a forthcoming article in the *Irish Naturalist* that the previous records of *A. vineale* L. along the Sixmilewater at Antrim were erroneous, the present species having been taken for it. There are several old records given in *Cybele Hibernica*, ed. 2, of the occurrence of *Chenopodium polyspermum* L. in Ireland. More recently, in July, 1906,

it was recorded by Miss Knowles as occurring at Straffan in Co. Kildare. I collected specimens on Aug. 28th, 1906, growing among shingle on the shore of Lough Neagh at Ardmore Point, a few miles south of Antrim.—J. Adams.

Helleborine v. Serapias (Journ. Bot. 1908, 396).—We learn from Mr. Ames that our supposition that the claims of *Helleborine* Hill had not been recognized was correct. Mr. Ames refers us to a paper by the late Mr. A. A. Eaton in Proc. Biol. Soc. Washington xxi. 63–67 (March 1908) in which *Serapis* replaces *Cephalanthera* and *Epipactis* (auct.), *Serapiastrum* Kuntze is substituted for the genus usually known as *Serapias*, and *Epipactis* replaces *Goodyera* R. Br. The two former must stand as *Helleborine* Hill and *Serapias* L.; but the adoption of *Epipactis* (=*Goodyera*) must be accepted. Mr. Eaton says: "The name *Epipactis* appears to have been first used since 1753 by Böhmer in the third edition of Ludwig's Definitiones Generum Plantarum. Although he makes no binomial combination, his genus is properly made, and he gives several references to the plant designated by Linnæus as *Satyrium repens*, now known as *Goodyera repens* R. Br., or *Peramium repens* Salisb. As the name *Epipactis* antedates all others for the group it must be adopted." The full reference is to Boehmer in Ludwig Def. Gen. Pl. [ed. 3] p. 337 (1760). Mr. Eaton, in accordance with the objectionable practice prevalent in some quarters, cites under the three genera all the species which he thinks should be placed in them: those under *Serapias* and *Serapiastrum* are of course "totgeboren"; those under *Epipactis* (subject of course to further examination from a botanical standpoint) will stand. Curiously enough, he never makes the actual and necessary combination *Epipactis repens* for our British plant, but presumably this may be cited as from. p. 65, where he has "*E. repens* var. *ophioides* (Fern.)"—Ed. Journ. Bot.

Lathyrus tuberosus in Suffolk.—I found this rare plant in 1907 in some quantity in the neighbourhood of Woolpit, Bury St. Edmunds, climbing luxuriantly among gorse and bramble; and in the autumn I gathered some well-ripened seed, of which in the beginning of 1908 two sowings were made, one about the end of February, the other a month later, but not a single plant has yet appeared. The plant has appeared again in 1908 in the same locality, even more plentifully, and about July a bush of bramble some two or three yards in diameter was quite gay with flowers. It has hitherto found no place in the Suffolk Flora, nor is there any record of its existence in either Norfolk or Cambridge. I have, however, a letter from a well-known botanist, who tells me he came across it in some quantity with other introduced plants a few years back in Lynn Docks. Although so long overlooked, I am convinced it has been long established here.—John Rasor.

Gagea lutea in Leicestershire—In the *Flora of Leicestershire* (1886) this plant finds no place, neither is it on record thence in Top. Bot. nor in the Supplement in this Journal for 1905. It was therefore satisfactory to see an example in the

Holmesdale Natural History Museum from the herbarium of Dr. J. A. Power, labelled "Cloud Wood, near Breedon," which I take to be in the county of Leicester, v.-c. 55. The specimen was probably collected between 1830 and 1840. *Gagea lutea* is on record for all the neighbouring counties, with the exception of Lincoln.—C. E. Salmon.

Saxifraga aizoides in Carnarvonshire (Journ. Bot. 1908, 395).—I have, in my herbarium, specimens gathered by me in August, 1898, near Capel Curig, v.-c. 49 Carnarvon. It was growing in short herbage on boggy ground on the edge of a small rivulet that falls into Llyn Mymbyr. When Mr. Salmon says that Price flourished in the "early eighties" he doubtless means in the early part of the nineteenth century. Price lived 1803–1887, and, residing at Chester, no doubt knew North Wales well.—S. H. Bickham.

Carex canescens Lightf. (Journ. Bot. 1908, 369–376).—Mr. Arthur Bennett informs me that since the publication of his Supplement to *Topographical Botany* he has received specimens of this plant from Nottinghamshire (see p. 370). He also points out that *Carex canescens* var. *subloliacea* (see p. 372) was first described by Læstadius in Nov. Acta Soc. Sci. Upsal. xi. p. 282 (1839).—F. N. Williams.

REVIEW.

Synopsis of the British Basidiomycetes: a Descriptive Catalogue of the Drawings and Specimens in the Department of Botany, British Museum. By Worthington George Smith, F.L.S. London: British Museum (Nat. Hist.). 8vo, cloth, pp. 531, tt. 5, 145 figs. in text. Price 10s.

All British mycologists will welcome the publication of this work, which incorporates the notes and original observations of so eminent a mycologist as Mr. Worthington Smith. Every botanist should secure this work and take up the study of the Basidiomycetes. The author says in his introduction: "The microscope is unnecessary for the determination of the greater number of the Basidiomycetes; nearly all are large and can be satisfactorily examined by the unaided eye or with the assistance of a hand-lens. A few forms found under Family iv. *Thelephoraceæ*, as *Solenia* and *Cyphella*, superficially resemble certain of the Ascomycetes, as *Peziza*; but with a little experience even obscure forms may be easily determined with the aid of a simple lens. In some genera of the *Thelephoraceæ* a microscopic examination of the hymenium is sometimes desirable," and we may add that in very many cases it is absolutely essential for the correct determination of a species. We wonder how the species of *Inocybe* could be arrived at without such an investigation, or how *Laccaria laccata* could be distinguished from *L. proxima*, which this work erroneously separates

from the former by its warted spores, a feature possessed by both species.

Over two thousand one hundred and twenty-two species are enumerated and their total is further increased by the fact that the consecutive numbers are in several instances preceded by an additional letter. In 1871, Dr. M. C. Cooke in his invaluable *Handbook of British Fungi* allotted one thousand and ninety-four forms to the British Basidiomycetes; this was increased by his second edition (1883), which only deals with the *Agaricaceæ*, to one thousand three hundred and thirty-two. Mr. George Massee on the completion of his third volume of the *British Fungus Flora* in 1893 assigned to this group about two thousand and seventy odd plants. Thus it will be seen that it is absolutely necessary that the student should obtain this work. It is to be regretted that Mr. Worthington Smith has decided to exclude any description of the form and size of the spores on this ground: "spore measurements have been omitted as untrustworthy; in many cases authors have measured immature spores from young plants, in others it is certain that authors have misnamed the fungus from which the spores have been taken." We feel quite certain that Mr. Worthington Smith's measurements would have been based on mature spores, though we are unaware whether he favours the obtaining of such ripe spores from those freely deposited in the mass on spore maps; this sudden modesty seems strange, as many of his spore measurements are given in Stevenson's *British Fungi* (*Hymenomycetes*).

The arrangement of the genera practically follows that which Fries set out in the second edition (1874) of his *Hymenomycetes Europæi*, with the exception that the subgenera of *Agaricus* are raised to the rank of genera and their number is further added to by the inclusion of *Amanitopsis*, *Hiatula*, and *Togaria*. Under *Hiatula* he places *Schulzeria Eyrei*, *lycoperdoides*, *Grangei*, and the usual *H. Wynniæ*, misspelt *Wynneæ* in the text. He makes the new genus *Togaria* amongst the *Dermini* to agree in nearly all points of structure and habit with *Lepiota*, *Annularia*, and *Psalliota*; and he transfers to this genus all Fries' *Humigeni* section of *Pholiota*. The genus *Tremellodon* is still retained in the *Hydnaceæ*, although its cruciately divided basidia shown in the accompanying illustration would lead most modern mycologists to place it amongst the *Tremellaceæ* family of the *Heterobasidiæ*. The statement that *Amanitopsis fulva* is poisonous is erroneous, as we have in company with many of our friends eaten and enjoyed this delicious esculent many times without the slightest inconvenience being experienced by any of us; it is probable that a specimen of *Amanita pantherina* that had lost its ring was mistaken for this species.

The raising of the subgenera of *Agaricus* to generic rank has caused the author to take the most extraordinary views as to the name of the authority that should appear after the specific name, instead of merely treating it as European mycologists do by making no difference in this respect. We cite as examples of this Engler

and Prantl *Pflanzenfamilien*, the *Bulletins de la Société Mycologique de France*, the splendid plates of Boudier's *Icones Mycologicæ*, Costantin and Dufour's *Nouvelle Flore des Champignons*, and the writings of Quélet and Patouillard, who all recognise that the splitting up of this enormous genus was due to the illustrious Fries himself. The British Mycological Society has also taken up the same position, and we regret that the author has not followed Rule V. of Saccardo's *De diagnostica et nomenclatura mycologica admonita quædam*, which was adopted by the British Mycological Society at their Whitby meeting on the 14th September, 1904; this really initiates no new departure, but is only a reaffirmation of an existing and well recognised principle. The rule runs as follows :—"When a specific name is transferred to another genus the original author is cited in parenthesis while the author of the new combination is also to be cited," and we maintain that the raising of a subgenus to full generic rank by a subsequent author does not entitle that author to treat it as a transference to another genus, but merely proves the soundness of the grounds upon which such a separation had been tentatively put forward and subsequent experience had proved justified. What principles have been adopted in lieu of this rule we cannot conceive, unless they are based on the Vienna Rules of 1905 which do not apply to non-vascular plants; and all mycologists will rejoice that this is so if their application should produce such an absurd array of authorities for species and genera. Quélet is quoted as the authority for the name of the genera *Clitocybe* and *Omphalia*, whereas all mycologists who use his instructive work, the *Flore Mycologique de la France* (1888), know that under *Omphalia* he includes all the species generally placed by other writers in *Clitocybe*, and that his genus *Omphalina* embraces the species generally assigned to *Omphalia*.

The authorities for the specific names are equally curious: the name of the original creator of a species seldom appears, although it might be assumed that he might be credited with knowing something about the species that he was describing, whereas a subsequent author might be wrong in his identification. We know that Quélet in several instances in his *Flore Mycologique de France* cites his plates which appeared in *Les Champignons du Jura et des Vosges* under different names to those under which they were issued in that work, and so admits that his previous determination was erroneous. We will now discuss a few examples:—*Lepiota Badhami* B. and Br. is attributed to Quélet, though Boudier has shown in the *Bulletin de la Société Mycologique de France*, vol. xvii. p. 176, that it was placed erroneously by him under *Lepiota hæmatosperma* Bull. *Amanita Vittadinii* Moretti is wrongly assigned to *Lepiota Vittadinii* Quél., although Quélet, along with all good mycologists, recognises that it is a true *Amanita*, but makes it synonymous with *Amanita umbella* Paul. *Collybia clavus* Quél. is described by Quélet under *Mycena rubella* Quél.; it is the *Agaricus clavus* Bull., the *Collybia clavus* Schaeff. in his *Flore Mycologique*, 1889, he makes synonymous with

Collybia esculenta Wulf., *tenacella* Pers., *stolonifera* Jungh., and *myosura* Fr. *Mycena chelidonia* Quél., Worthington Smith still retains under the *Lactipedes* section, but Quélet transfers this species to the *Adonideæ* with Fries as the authority, and he is justified in this arrangement because the stem is practically juiceless. *Psalliota echinata* Quél., Quélet has rightly assigned to *Lepiota echinata* Roth, and Boudier has in recent years proved that it is identical with *Lepiota hæmatosperma* (Bull.), a species that is not mentioned in this work though often met with in gardens and hedgerows. Other authorities are cited in an equally incorrect way. *Flammula rubicundula* Rea was originally published on the plate that accompanied the description which appeared in the March issue of *Grevillea*, vol. 22, but the text in the previous issue had been altered by the editor to *Agaricus* (*Flammula*) *rubicundula* Rea. It was called *Flammula rubicundula* Rea in the then current issue of Berrow's *Worcester Journal*, which was subsequently incorporated in vol. i. of the *Transactions of the Worcestershire Naturalists' Club*, p. 394. *Hypholoma pseudostorea* Rea was never so published but by Worthington Smith in Journ. Bot. xli. (1903) p. 386; we only know this plant as *Hypholoma lacrymabundum* Fr., which is the *Geophila* (*Stropharia*) *cotonea* Quél. We presume that there will have to be another great hunt for authority, as *Tricholoma Russula* Gill., which is identical with *Hygrophorus erubescens* Fr., has appeared with the ominous letter "A," before it, meaning, we presume, *Agaricus*, in the present work. *Lepiota submarasmioides* Sacc. is described as occurring on "low ground at Worcester," whereas it was discovered growing on the hills in this county near an elevated valley called the White-leaved Oak on the Malvern Chain. We observe that the author publishes under his own name a description of a *Russula* which we had provisionally named *mitis* in our own private collection, and which we intended to publish if subsequent investigation proved that it was a new and distinct species. *Russula luteotacta* Rea was based on specimens submitted to the Kew authorities who declared it undescribed, but we now know that it is only a form of *Russula sardonia* Fr.

The book is got-up in excellent style, with numerous woodcuts representing the genera, and the species are enumerated consecutively, thus enabling a student to make it the basis of his collection of specimens or paintings. It thus forms a welcome addition to the Museum Catalogues.

CARLETON REA.

[It may be well to supplement Mr. Rea's notice by the prefatory note appended to the book, which explains its origin and scope:—"In 1905 the Trustees acquired the manuscript descriptions drawn up by Mr. Worthington G. Smith, when preparing the fine series of coloured drawings of British Fungi which are exhibited in the Public Gallery of the Department of Botany. The descriptions were accompanied by line drawings illustrating the characters of each genus. In 1907 the Trustees gave permission for their publication in the form of the present Handbook, which it

is hoped will prove a useful introduction to the study in the field of the larger British Fungi. Of the numerous introduced species all that have appeared in the open air are included; but those occurring in greenhouses and stoves are omitted, except those which continually reappear, and those which stray into gardens."

Mr. Rea refers to "the most extraordinary view" taken by Mr. Smith as to the authority for the specific names when subgenera are raised to generic rank. This is, as he supposes, in accordance with the Vienna Code, and we cannot allow that in matters of principle this Code does not apply to non-vascular plants. Art. 9 states: "The rules and recommendations of botanical nomenclature apply to all classes of the plant kingdom, reserving special arrangements for fossil plants and non-vascular plants" with a foot-note: "These special arrangements have been reserved for the Congress of 1910. They comprise: 1, rules bearing on special points in relation to the nature of fossils or the lower plants; 2, lists of *nomina conservanda* for all divisions of plants other than Phanerogams." It is absurd to suppose that first principles of botanical nomenclature will again be discussed in connection with each division of non-vascular plants.

We have asked Mr. W. E. St. John Brooks, who assisted in the preparation of the *Synopsis* for the press, to comment upon Mr. Rea's criticisms as regards nomenclature.—Ed. Journ. Bot.]

Clitocybe and *Omphalia*. Quélet is quoted as the authority for the names of these genera, as he was the first to raise them from subgenera of *Agaricus* to generic rank (Champ. Jura et Vosges, 1870–75). Though Quélet later (Flor. Myc. France, 1888) transferred a number of species formerly placed in *Clitocybe* to *Omphalia* and in *Omphalia* to *Omphalina* respectively, the fact remains that Quélet is the authority for *Clitocybe* and *Omphalia* in the sense employed by Mr. Smith, which is that of Fries and of Quélet originally.

Lepiota Badhami. This plant was named *Agaricus* (*Lepiota*) *Badhami* by Berkeley and Broome (Berk. Brit. Fungi, 1860). Quélet called it *Lepiota Badhami* (Champ. Jura et Vosges, pt. i. 1870–72), but subsequently regarded it as identical with his *L. hæmatosperma* (Flor. Myc. France, 1888). As Mr. Rea points out, Boudier proved that Quélet was wrong in his synonymy. This however does not alter the fact that Berkeley's plant was first called *Lepiota Badhami* by Quélet, who is therefore the authority for the name.

Lepiota Vittadinii. *Agaricus Vittadinii* of Moretti (Bot. Ital. 1826) was placed in the subgenus *Lepiota* by Fries (Epic. System. Myc. 1836–38). Quélet called it *L. Vittadinii* (Champ. Jura et Vosges, pt. ii. 1873) but subsequently (Flor. Myc. France, 1881) regarded it as an *Amanita*, and made it synonymous with *umbella* of Paulet. As in the former case, this does not alter the fact that Quélet is the correct authority for the name *Lepiota Vittadinii*. The question as to the proper genus is simply one of difference of opinion between Mr. Smith, who follows Fries, and Mr. Rea, who adopts Quélet's later views.

Collybia clavus. The *Agaricus clavus* of Linnæus (Flor. Suec.

1755) was regarded by Fries (Syst. Myc. i. 1821) as consisting of two species, *A. esculentus* Wulf. and *A. clavus* proper. Schaeffer's drawing (Fung. Bav. et Palat. i. 1762) of *A. clavus* was shown by Persoon (Comment. 1800) to be the *esculentus* of Wulfen. The same view was taken by Fries (Syst. Myc. i. 1821), who recognized the two species: *A. esculentus* Wulf., which he identified with Schaeffer's plant, and *A. clavus* L., to which he refers a drawing of Bulliard. Fries placed both plants in the subgenus *Collybia*. Quélet (Champ. Jura et Vosges, pt. i. 1870–72) was the first to call them *Collybia esculenta* and *C. clavus* respectively, quoting Wulfen and (Linnæus) Fries as authorities in each case; subsequently (Flor. Myc. France, 1888) he called the *clavus* of Bulliard's drawing *Mycena rubella* and the *clavus* of Schaeffer's drawings *Collybia clavus*, placing with it as a synonym *Agaricus esculentus* Wulf. Quélet is thus responsible for naming two distinct plants *Collybia clavus*. Both plants were regarded by Linnæus as the same, but have ever since been separated. It was of course optional to which plant the Linnæan name should be given but it having once been given to one plant and adopted by Quélet himself, following Fries, it seems obvious that it cannot be transferred by Quélet to another. The earlier name must be adhered to and *Collybia clavus* Quél. must be understood to mean the *Agaricus* (*Collybia*) *clavus* of Fries.

Collybia tenacella and var. *stolonifera*. The same remarks apply to these plants which, along with *myosura* (not in Mr. Smith's book), Quélet subsequently (Flor. Myc. France, 1888) regarded as identical with *esculenta*, placing them all as synonyms under *Collybia clavus* (Schaeff.) Quél.

Psalliota echinata. *Agaricus echinata* of Roth (Catal. Bot. 1797–1806) was placed in the subgenus *Psalliota* by Fries (Epic. Syst. Myc. 1836–38). Quélet called it *Psalliota echinata* (Champ. Jura et Vosges, pt. iii. 1875), but subsequently (Flor. Myc. France, 1888) placed it in the genus *Lepiota*. *Agaricus* (*Psalliota*) *hæmatosperma* is also of Fries, but the name is not included in Mr. Smith's book, for, as Mr. Rea points out, the two species have been proved by Boudier to be the same.

Flammula rubicundula. This plant was originally published as *Agaricus* (*Flammula*) *rubicundula* Rea ex Mass. in *Grevillea* xxii., 1894. It is called *Flammula rubicundula* by Saccardo (Syll. Fungi xiv. 1899), and Saccardo is quoted as the authority in Mr. Smith's book, it not having been noticed that on the plate accompanying the description in *Grevillea* it is named *Flammula rubicundula* Rea. Rea should therefore stand as the authority.

Hypholoma pseudostorea. This was published by Mr. Smith as *Agaricus pseudostorea* in Journ. Bot. 1903, 386, and for the first time as *Hypholoma pseudostorea* by Mr. Rea in the *Transactions of the Mycological Society* (1904). Rea is therefore the correct authority.

Tricholoma Russula. The "A" in this case is obviously a misprint for "T," the name of the genus (*Tricholoma*) being at the top of the page.

Russula mitis and *R. luteotacta* stand on precisely the same footing; it is optional to quote MS. authorities in herbaria, and, as Mr. Rea's reference to *luteotacta* shows, not always desirable. In each case the name may be cited as of "Rea in herb."

As regards *Hiatula Wynneæ*, the specific name as it stands in the Catalogue is the proper spelling according to the laws laid down by the Vienna Congress.

W. E. St. John Brooks.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on November 19th last Mr. Harold Wager gave a lantern demonstration on "The Optical Behaviour of the Epidermal Cells of Leaves." He stated that Professor Haberlandt had suggested that the epidermal cells of certain leaves are functional as ocelli or primitive eyes, and are capable of the perception of light. The structure of these cells is such that the rays of light which fall upon them are refracted and brought to a focus, and in one case Haberlandt was able to obtain a photograph of a microscope the image of which was focussed upon the basal walls of the epidermal cells. This image, as figured in his book, is not very clear, and it has since been found possible to obtain much clearer images of a variety of objects through the cells both of the upper and lower epidermis of many leaves, including portraits from life, flowers, houses, and landscapes, reproductions of photographs and pictures, and simple diagrams in colour on the autochrome plates of Messrs. Lumière. In order to explain this lens-function, Haberlandt has put forward the extremely interesting hypothesis that the convergence of the light rays causes a differential illumination of the protoplasmic layer on the basal walls of the epidermal cells, and sets up a stimulus which results in the orientation of the leaf into that position in which it can obtain the most suitable illumination. There is no doubt a good deal of evidence in favour of Haberlandt's view, but there are many facts to be explained before a definite conclusion can be arrived at. For example, convergence takes place in the lower as well as in the upper epidermal cells, as shown by Albrecht for *Viscum* and by the exhibitor in many other plants. In a species of *Mesembryanthemum* there are special lens-cells equally well developed on the lower surface as on the upper surface. In *Garrya elliptica* also there are special lens-shaped thickenings of the cuticle equally well developed on both surfaces. The papillate cells of many petals show a very clear convergence. It is not impossible that the convergence may bring about a more efficient illumination of the chlorophyll grains. Haberlandt himself suggested something of this kind many years ago, and the numerous observations which have been made upon *Schistostega*, *Osmundaceæ*, some Selaginellas and Hepatics, and other plants, and some observations by the exhibitor upon *Botrydium granulatum*, all clearly indicate that this hypothesis must be taken into account. It is significant also that epidermal cells with long focus

appear to be associated with long palisade-cells, whilst the cells with short focus are associated with short palisade-cells.

At the same meeting the Rev. John Gerard, S.J., showed a series of lantern-slides: (*a*) illustrating Yew-stems naturally inarched, from Stonyhurst, Lancashire; and (*b*) *Wistaria* stems, one of which, having been twined round a pillar "clock-wise" fashion, had ceased to put forth fresh shoots, though still living; the other, having twined itself "counter-clockwise," had flowered freely.

Edward Trusted Bennett, who died at Port Isaac, Cornwall, on Nov. 16, 1908, was best known as the Secretary of the Society for Psychical Research—a post which he held for many years. He was born in London, July 1, 1831, and was the eldest son of William Bennett and brother of Alfred William Bennett, in whom the interest in botany which characterized father and sons reached its fullest development. Edward Bennett as a young man collected in Cornwall and the New Forest; of the plants of these districts he published some account in the *Phytologist*, iv. 1–5, 753-756 (1851–2).

The fourth volume of the late Prof. Marshall Ward's series on *Trees* (Cambridge University Press), which the author unfortunately did not live to complete, has been edited from his MSS. by Dr. Groom, who in a short preface tells us that the present will be succeeded by a fifth volume, for which also the manuscript exists. The present instalment is devoted to Fruits, which are treated as comprehensively as the subjects of the earlier volumes, and are abundantly illustrated by figures, derived from various sources, which number nearly as many as the pages. The book is of course excellently printed, but is surely rather dear—4*s*. 6*d*. net for 160 pages!

Mr. W. B. Hemsley, who has for so many years been intimately associated with the work of the Kew Herbarium, terminates his official connection therewith at the end of 1908. There is fortunately no necessity to give any appreciation of his work, for we believe he has no intention of severing his connection with systematic botany, the knowledge of which he has done so much to augment. It may be noted in this context that the Editor of this Journal, having completed his forty years in the Civil Service, will retire from the National Herbarium in September next.

Miss Jekyll has added to her many books—all excellent—on gardens and flowers one on *Children and Gardens* (6*s*. net; "Country Life" Offices) which will be enjoyed not only by those for whom it is especially intended but also by their parents. For although there is much practical instruction, conveyed in language suited to the youthful mind, as to what to grow and how to grow it, with a good deal of useful botanical information thrown in, the book has a distinct literary charm which perhaps will be more appreciated by 'grown-ups' than by children. The former, too, will enjoy the numerous and charming illustrations, especially if they share the author's love of cats. We endorse Miss Jekyll's

suggestion that *Flowers of the Field* should be the text-book of the young observer of wild flowers, but we are sorry she did not particularize the original work, published by the S.P.C.K., as another edition, in every way inferior, is on the market (see Journ. Bot. 1907, 347).

In 1891 Sir Edward Fry delivered a lecture on *British Mosses* at the Royal Institution, and published it in the form of an illustrated book which has had a wide circulation and has induced many readers to take up the study of mosses. Simply written, it treats of the classification, life-history, modes of reproduction, and structure of mosses, and of the important services they render in nature. In this latter respect emphasis is laid upon the *rôle* played by the *Sphagnaceæ*, and upon their relation with the formation of peat and with the ancient forest-beds. In the present (second) edition (London: Witherby & Co., 1908, pp. viii. and 72, 40 figs., price 1*s.* 6*d.* net) the text has been revised and the figures have been redrawn and added to.

M. Félix Alcan has issued, in the "Bibliothèque Scientifique International," a French translation by Dr. Blaringhem of De Vries's *Origin of Species and Varieties by Mutation*, which was reviewed in this Journal for 1905, p. 163. Prof. de Vries contributes a short preface to this edition, which, it may be noted, is much cheaper (12 fr., bound) than the English original (21*s.*).

Miss Emmeline Crocker's *Thirty-nine Articles on Gardening* (8vo. pp. 158, cloth, Dulau & Co.) are hardly likely to cause as much controversy as another and more widely-known Thirty-nine, but they are not altogether free from the dogmatism which distinguishes the earlier series. "The flaunting colours, pronounced markings, or delicious perfume of a flower exist *solely*," the author tells us, "in order that insects and other animals, may be attracted to it" (p. 97). How does she know? and are we to infer that flowers devoid of these attractions are unvisited by insects? Hardly; for we find from Knuth's *Handbook of Flower Pollination* (English translation) that twenty specified insects belonging to different groups, as well as others unnamed, visit *Teesdalia*, while under *Papaver alpinum* we only read "Hermann Müller observed several flies in the Alps," and for *P. Argemone* only a single house-fly is mentioned. All the same, Miss Crocker has given us a pleasant chatty little book, conveying a good deal of information not confined to gardening. It would have been better than it is if some botanist had revised the proofs: *e.g.* on p. 127 she speaks of *Geranium* and *Pelargonium* as "species" and of the former as "a plant native to our islands." She is so struck with the importance of distinguishing these genera that she twice tells us how to do it (pp. 6, 127), but the popular nomenclature is too well established to be corrected, and indeed has its convenience. The book is as full of italics as are the late Queen's letters—Latin and English plant-names, names of places, and anything which seems to require emphasis are so printed. There are misprints—e.g. "*Hibiscus rosa, H. sinensis*" (p. 47), "*Falsia*" (p. 9). The six coloured plates do not adorn the book.

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(Continued from Journ. Bot. 1907, 316.)

Galium bermudense L. Sp. Pl. 105.

Galium foliis quaternis linearibus obtusis, ramis ramosissimis.

"Aparine foliis quaternis obtusis lævibus. *Gron. virg.* 16.

"Rubia tetraphylla glabra, latiore folio, bermudensis, seminibus binis atropurpureis. *Pluk. alm.* 324. *t.* 248 [f. 6] *Raj. suppl.* 261.

"*Habitat in* Virginia."

The position of this species has always been somewhat of a puzzle, nor is this to be wondered at, seeing that comparison of authentic material shows that two very different plants were included by Linnæus under the name. There are no specimens in the Linnean herbarium, but in the National Herbarium we are fortunate in possessing the authentic material of Gronovius and Plukenet. It will be observed that the locality cited by Linnæus belongs to the former, while his trivial name is taken from the latter.

The Gronovian plant is certainly identical with *G. pilosum* Ait. (Hort. Kew. i. 145); the specimen so written up by Dryander and referred to in Solander's MSS. is endorsed "America sept. prope New York, Dr. Martin." Another specimen on another sheet—at first named *pilosum* by Dryander, who subsequently erased the name and substituted another—seems to be *G. hispidulum* Michx.; my only reason for mentioning this is that the entry in Hort. Kew. "Introd. 1778 by John Fothergill M.D." refers to it, and the sheet is endorsed "Hort. Fothergill, 1788" by Dryander. The identity of *G. bermudense* L. with *G. pilosum* Ait. is suggested by Britton & Brown (Illustr. Fl. N. Amer. iii. 221), who rightly maintain Aiton's name for the species, in contradistinction to previous writers, who have placed *G. pilosum* (1789) as a variety of *G. puncticulosum* Michx. (1803).

The identification of Plukenet's plant has presented greater difficulty, owing to the fact that up till now the specimen does not seem to have been consulted. Linnæus of course had only the figure in *Phytographia* before him with the brief diagnosis in the *Almagestum*, and Mr. Hemsley (Bot. Challenger, Bermudas 39) refers to American identifications and says "it is doubtful what Plukenet's plant really is." But an inspection of the original Bermudan specimen in Herb. Sloane 32 f. 82 shows it to be *Relbunium hypocarpium*, which was collected in the Bermudas by Lefroy and Moseley; in this identification Mr. Hemsley concurs. The specimen is doubtless one of those collected in 1699 by John Dickinson, whose Bermudan plants form the main subject of a paper by Mr. Hemsley in this Journal for 1883, pp. 257, 261; *Carex bermudiana*, there described from a specimen collected by

Dickinson, has not been found since his time. The label is in the hand of Petiver, to whom Dickinson sent his plants and from whom Plukenet received it; and the specimen—which was strangely overlooked when the rest of the Bermudan plants were identified (Journ. Bot. *l. c.*)—is associated with these in Herb. Sloane. It may be noted that in the copy of Ray's *Historia* which serves as an index to the Sloane Herbarium, Dryander has written "*Galium bermudense* L." and a reference to H. S. 32 f. 82 against the description cited from Plukenet; thus showing that he differentiated it from the Gronovian plant which he named *G. pilosum*.

The question as to the disposition of the name *G. bermudense* L. remains for consideration. It can hardly be said to "embrace elements altogether incoherent" nor can it be "a *permanent* source of confusion or error," for such confusion as may have arisen in the past has been removed by the examination of authentic material. If retained, as I think it must be, for one of the two plants included under it, the question is—which? for the brief diagnosis might include both.

The balance seems to me in favour of retaining *bermudense* for the Bermudan plant, from Plukenet's description of which the name was taken by Linnæus. It is certain that Linnæus had Plukenet's figure before him, while the absence of anything representing the species in the Linnean herbarium renders it doubtful whether he ever saw Gronovius's plant. It can hardly be urged, in the face of the general acceptance of *Asclepias syriaca*, that the inappropriateness of applying the name *bermudense* to a plant which does not grow in the Bermudas would prevent its use, nevertheless it has a certain bearing on the question; though it may be urged Linnæus gives "Virginia" as the only habitat for the plant, and also that the *Relbunium* is by no means peculiar to the Bermudas, being generally distributed in South America and the West Indies, from which it was described later by Linnæus (as *Valantia hypocarpa*).

I therefore propose the following readjustment of nomenclature:—

RELBUNIUM BERMUDENSE comb. nov.
Galium bermudense L. Sp. Pl. i. 105 (1753) excl. syn. Gronov. and locality.
Valantia hypocarpa L. Pug. Jamaic. 30, n. 24 (1759); Syst. Nat. ed. 10, 1307 (*hypocarpia*) (1759).
Rubia hypocarpia DC. Prodr. iv. 591 (1830).
Galium hypocarpium Grisebach Fl. Br. W. Ind. 351 (1861).
Relbunium hypocarpium Hemsley Bot. Biol. Centr. Amer. ii. 63 (1881).

GALIUM PILOSUM Aiton Hort. Kew. i. 145 (1789); Willd. Sp. Pl. i. 559 (1797) et auct. plur.
G. bermudense L. Sp. Pl. 105 quoad pl. Gronov.
G. puncticulosum β pilosum DC. Prodr. iv. 601 (1830).

TRIOSTEUM HIRSUTUM Roxb. Fl. Indica ii. 180 (1824).

This name occurs twice in vol. iii. of the *Flora of British India*: on p. 8, where it is retained as a species in Mr. C. B. Clarke's monograph of *Caprifoliaceæ* and is cited as of "Wall. in Roxb. Fl. Ind. ed. Carey & Wall. ii. 180"; and on p. 180, where it is cited as of "Roxb. Fl. Ind. i. 538" and placed by Sir Joseph Hooker as a synonym of *Lasianthus cyanocarpus* Jack. That this latter determination is the right one is manifest from specimens in the National Herbarium named by Roxburgh himself *Triosteum hirsutum*; but it is not easy to understand how it has happened that the plant has been accepted as caprifoliaceous. It is not as though two plants had been confused, for the descriptions in the two editions of Roxburgh are identical in every respect, and the authority for each, as stated in each description, is Roxburgh. The description of the leaves alone—"short-petioled, lanceolar, entire, acuminate"—is sufficient to show that Roxburgh's plant cannot be identical, as Mr. Clarke supposes, with *T. himalayanum* Wall., in which they are "obovate, acute, connate at the base." De Candolle (Prodr. iv. 330), following Roxburgh & Wallich, kept them apart: Hooker & Thomson (in Journ. Linn. Soc. ii. 173) cite under *T. himalayanum* the specimens collected by themselves, and others which Mr. Clarke places under *T. hirsutum*, and add "Quid *T. hirsutum* Roxb. Fl. Ind. ii. 180?" showing that the plant was by them regarded as doubtful.

The final confusion by which *T. hirsutum* is substituted for and considered identical with *T. himalayanum* is due to Clarke (*l.c.*) who not only places the latter as a synonym, but gives an explanation which must be cited in order that its numerous inaccuracies may be explained and the confusion finally cleared up. He writes: "H. f. & T. have been misled by DC. into supposing that Wallich described *T. hirsutum* from Chittagong as a different species from *T. himalayanum*. The origin of the error appears to have been that DC. read Wallich's ms. locality 'Gossain Than' as the Sanskrit spelling of Chittagong. DC. further misprints the fruit as 5-seeded, whereas Wallich states (rightly) 3-seeded." It seems difficult to suppose that Clarke can have looked at the original descriptions; had he done so he would have seen that Wallich not only described *T. himalayanum* as distinct from *T. hirsutum*, but gave leaf-characters—"obovate, acute, connate at the base"—already quoted, which preclude any possibility of their being identical. The localities also stand as cited by De Candolle—"Chittagong" for *T. hirsutum* and "Gosain-Than" for *T. himalayanum*; nor is there any "misprint" as to the fruit, of which De Candolle merely quotes the original description.

The accuracy of Sir Joseph Hooker's determination (which is made also by King & Gamble, Fl. Malayan Penins. no. 15, 113)* is confirmed by specimens in the National Herbarium named

* The arrangement and pagination of this important work renders it difficult to quote.

Triosteum hirsutum in Roxburgh's hand, the ticket of which refers to the "sky-blue" seed which suggested Jack's name.

The synonymy of the plants is:—

LASIANTHUS CYANOCARPUS Jack in Trans. Linn. Soc. xiv. 125 (1823).
Triosteum hirsutum Roxb. Hort. Bengal. 86, nomen (1814) and in Herb. Mus. Brit. !; Roxb. Fl. Indica ii. 180 (1824); [ed. 2] i. 538 (1832)*; DC. Prodr. iv. 330 (1830).

TRIOSTEUM HIMALAYANUM (sphalm. *himaluyanum*) Wall. in Roxb. Fl. Indica ii. 180 (1824); DC. Prodr. iv. 330 (1830); Hook. f. & Thoms. in Journ. Linn. Soc. ii. 173 (1858).
T. hirsutum C. B. Clarke in Fl. Brit. Ind. iii. 8 (1880); Forbes & Hemsl. Index Fl. Sinensis i. 357 (1888); Strachey, Cat. Pl. Kumaon, 78 (1906); non Roxb.

CORION Mitchell.

At the time when the discussion was raging as to the name to be adopted for the genus which by the Vienna List is to be called *Spergularia*, Dr. Britton proposed (Journ. Bot. 1891, 303) the restoration of *Corion*, published by Mitchell in Act. Acad. Nat. Corr. viii. App. 218, as the oldest name for the genus. In this he was supported by Mr. N. E. Brown (Supp. E. Bot. ed. 3, 47 (1891)), who renamed under *Corion* all our British species; these names, however, were entirely overlooked by the compilers of the first Supplement (for 1886–1895) to the *Index Kewensis*, only one being cited from a later publication. Mitchell's description has probably been rightly identified with *Spergularia*, but his name, having been published in 1748, has, after this brief resuscitation, been dropped by common consent. It may however be worth putting on record that in the course of sorting some undetermined plants in the National Herbarium I came across a specimen sent to Banks from Virginia by Mitchell and written up by Dryander "*Corion* Mitchell nov. gen." This, which Mr. Moore has examined, is identical with *Polypremum procumbens* L., although it will be seen that Mitchell's description, transcribed by Dr. Britton in the above-mentioned note, does not correspond with that plant.

PÆDEROTA BONÆ-SPEI L. Sp. Pl. ed. 2, 20.

For this plant, rightly referred by Mr. Hiern (Fl. Cap. iv. 2, 148) to *Diascia nemophiloides* Benth., Linnæus both here and in his first description (as *Hemimeris bonæ-spei*) in Pl. Rar. Afr. 8, n. 1 (1760) cites Pluk. Phyt. 320, f. 5; this however represents *Scoparia dulcis*. Mr. Hiern also cites as a synonym *Anagallis capensis* Sp. Pl. 149, which Linnæus based on "Anagallis purpurea, bursæ pastoris foliis minoribus Pet. Mus. 245" [recte 345], of which Petiver's original specimen, received from Oldenland, is in Herb. Sloane, vol. 156, f. 157. It is, by the way, much to be

* The latter reference only is given in *Index Kewensis*.

regretted that the authors of the monographs in the *Flora Capensis* have not more frequently consulted the Sloane Herbarium. The name of the plant, if *Diascia* be retained for the genus, is:—

DIASCIA CAPENSIS comb. nov.

Anagallis capensis L. Sp. Pl. 149 (1753).
Hemimeris bonæ-spei L. Pl. Rar. Afr. 8, n. 1 (1760).
Pæderota bonæ-spei L. Sp. Pl. ed. 2, 20 (1762).
Diascia nemophiloides Benth. in DC. Prodr. x. 257 (1846) who did not recognize its identity with the Linnean plant; Fl. Cap. iv. 2, 148 (1904).

It will however be remembered that Mr. Hiern in the MS. of his monograph placed all the species described in Fl. Cap. as *Diascia* under *Hemimeris*, for reasons exposed in this Journal for 1901, p. 103, and that their position under *Diascia* is due to the editor of the work (see J. Bot. 1904, 125). The matter is not one of those decided by the List appended to the Vienna Rules.

COMPTONIA "Banks."

M. Chevallier in his monograph of *Myricaceæ* follows the *Index Kewensis* in attributing this genus to Banks, the authority cited by the latter being "Banks ex Gaertn. Fruct. ii. 58 (1791)." The first publication, however, is in Ait. Hort. Kew. iii. 334 [1789], where it is referred to "L'Hérit. stirp. nov.," the species, *C. asplenifolia*, being quoted from "L'Hérit. stirp. nov. tom. 2, tab. 58." L'Héritier published neither name nor description, though the former occurs in his letter to Dryander dated 8 Feb. 1789 (see Journ. Bot. 1905, 269, 270). Although the genus-name in Gaertner stands as of Banks, the description is said to be "ex schedis Solandri." and a reference to Solander's MSS. shows no evidence that Banks had anything to do with the name nor does it appear in his hand in his herbarium; and Thomas Martyn in his edition of *The Gardeners' Dictionary* says it was given by Solander. Solander's MS. description is based on specimens collected in Maryland by the Rev. Hugh Jones (fl. 1697–1701) (H. S. 74, f. 8; 159, f. 111). In the Hort. Kew. the date of introduction is "Cult. 1714, by the Dutchess of Beaufort," with a reference to the specimen, which is labelled "Fearne Tree," in "H. S. 141 [140], fol. 37." Petiver, however, writing in 1700, says that he had observed it for several years in the Apothecaries' Garden at Chelsea (Mus. Pet. n. 773).

I note that M. Chevallier, following O. Kuntze, takes up *peregrina* as the specific name for the plant. Linnæus described it twice—as *Liquidambar peregrinum* (Sp. Pl. p. 999) and as *Myrica asplenifolia* (p. 1044). Solander, having both names before him, chose the latter, and, except for those who adopt the generally discredited principle of "priority of place," there seems no reason for abandoning so appropriate a name in favour of one which has nothing to recommend it.

"BAMBOS ARUNDO Soland. Fl. Ins. Ocean. Pacif. 217."

Folk may be puzzled to trace this name, which the *Index Kewensis* prints as above, as given by Munro in Trans. Linn. Soc. xxvi. 137, in the synonymy of his *Schizostachyum glaucifolium*. Solander's work was never published, and the name intended appears in the MS. as *Arundo Bambos*—the Linnean name for *Bambusa arundinacea* Willd., to which Solander erroneously referred his plant. Seemann (Fl. Vit. 323) similarly transposed the generic and specific names, but correctly added "ined." to the reference.

CONVOLVULUS ROSEUS Mill. Dict. ed. 8, n. 18 (1768).

Choisy (in DC. Prodr. ix. 380) places this as a synonym of *Ipomœa fastigiata* Sweet on the authority of a specimen from Miller in the National Herbarium. There is indeed in the Herbarium a specimen from Miller so labelled, but a very slight comparison with the description suffices to show that this cannot be the plant of Mill. Dict. We have however another sheet from Miller which bears in his own hand the descriptive phrase of n. 18 in the *Dictionary* and also that of Houstoun, therein cited, who sent the specimen to Miller; and this—the true type of *C. roseus*—is *Pharbitis cathartica* Chois. For this Miller's name must be adopted: the synonymy will be :—

PHARBITIS ROSEA comb. nov.

Convolvulus roseus Mill. Gard. Dict. ed. 8, n. 18 (1768).
C. americanus Nicols. Hist. Nat. Saint-Domingue, 260 (1776).
Ipomœa cathartica Poir. Suppl. Encycl. Méthod. iv. 633 (1816).
Pharbitis cathartica Choisy in DC. Prodr. ix. 342 (1845), **c. syn.**

It may be noted that the misquotation of Nicolson's name as *C. africanus*, originated by Poiret, has been followed by subsequent authors, including Choisy and the *Index Kewensis*—so much easier is it to quote at second or third hand than to turn up a reference! Choisy further inaccurately rendered the author's name as "Nick." which is expanded in Ind. Kew. to "Nickols." Nicolson, according to his preface and the *imprimatur* at the end of his work, was a Dominican who had lived about four years in St. Domingo: he wrote the book in 1773 (see p. 16).

DAPHNE AMERICANA Mill. Dict. ed. 8 (1768).

This plant, identified in *Index Kewensis* as "*Daphnopsidis* sp." is, as the specimen from Miller's herbarium shows, *Strumpfia maritima* Jacq. Pl. Carib. 28 (1760). Miller raised it from seed in Chelsea Garden.

(To be continued.)

BRECON AND WEST YORKSHIRE HAWKWEEDS.

By the Rev. Augustin Ley, M.A.

(Concluded from p. 16.)

H. ampliatum, sp. nov. *H. sarcophyllum* Stenstr. var. *ampliatum* W. R. Linton, *Brit. Hier.* p. 54. Yorks, rare, on the scaurs and in the glens; not in Brecon. 1. Moughton Scaurs. 2. Ingleborough Scaurs; Chapel-le-Dale and Beazley Glen, Ingleton. Dent Dale, on slate. 3. Hestleton Glen. Dahlstedt's judgment (*in litt.*, 1907) on this plant, "Not at all *H. sarcophyllum*; it has greater heads with different clothing, and different leaves," leaves the writer no choice but to give it specific rank.

H. prætenerum Almq. Yorks, rare; not in Brecon. 3. Cliffs of Penyghent, 1901; Arncliffe, 1904.

H. euprepes F. J. Hanb. Type locally abundant in Brecon; absent from Yorks. I. Taren-'r-Esgob and Taren-llwyd, fine and plentiful. II. On all the cliffs of the Beacon range, from Craig Cille westward to Craig Rhiwarth, on limestone and sandstone. Abundant on the Fan Fechan Cliff, Carmarthen.

Var. *glabratum* Linton. Absent from Brecon? rare in Yorks. 1. Feizor Scaur, Settle. Railway-bank at Horton, in Ribblesdale. 3. Hestleton Glen; Buckden, on the Upper Wharfe.

Var. *clivicolum* F. J. Hanb. Locally abundant in Brecon; rare in Yorks. II. Dyffryn Crawnon; Fan Las Waterfall at the head of Glyn Collwng; Cwm Tarell, Cwm Senni, and in the Byffre Glen, limestone and sandstone. 2. Ingleborough and Keld Head Scaurs, scarce, 1902. 3. Craig Buckden, Skipton, 1891; *T. A. Cotton*!

Dahlstedt (*in litt.*, 1907) would separate vars. *clivicolum* and *pruiniferum* from *H. euprepes*; the writer, after an experience of var. *clivicolum*, both as a wild plant and under cultivation, extending over a long series of years, is distinctly of opinion that it is best placed as a variety of *H. euprepes*.

H. cæsium Fr. Brecon, rare; not detected in Yorks. II. Stream-side, Taf Fechan Glen. Small stream glen under Fan Hir Cellwen?

Var. *rhomboides* Stenstr., f. Absent from Brecon; rare in Yorks, in river-glens and on scaurs. 1. Ribblehead, 1902. 2. Twistleton Scaur; *Herb. Hanb.*! 3. Buckden, in Upper Wharfedale, 1904.

Var. *coracinum* Ley. Brecon, very local. II. On Craig Gledrian, in fair quantity. A remarkable and very distinct plant, which has up to the present time not been detected in any other county or station.

H. cæsiomurorum Lindeb. Rare in both counties. Brecon: II. Limestone rocks above Dyffryn Crawnon; cultivated for many years. 1. Moughton Scaur, Clapham; *Miss Thompson*! *teste* Elfstrand. 2. Ingleborough Scaurs, above Chapel-le-Dale. Cauntley Spout, on slate.

H. DISSIMILE Lindeb. Yorks, very rare; not in Brecon. 2. On the Rothay below Sedbergh; *teste* E. F. Linton.

H. DURICEPS F. J. Hanb. Yorks, on river-rocks; type rare. 1. Ribblehead. 2. On the Rothay, four miles above Sedbergh.

Var. *cravoniense* F. J. Hanb. Yorks, on river-rocks and scaurs, frequent. 1. Settle; *Miss Thompson*! Ribblehead. 2. Chapel-le-Dale, Beazley, and Thornton Glens, Ingleton. Dent Dale, plentiful. On the Rothay, near Sedbergh. Ingleborough and Long Scaurs, Ingleton. 3. Hestleton Glen; Westmore Scaur, Arncliffe; Kidstones Scaur, on the Upper Wharfe.

Both the varieties absent from Brecon.

H. VULGATUM Fr. Brecon? frequent in Yorks. The type is abundant throughout the districts, and localities need not be enumerated.

Var. *subfasciculare* W. R. Linton. Rare; and perhaps the true plant not found. 2. Hillside above Chapel-le-Dale; "nearest to this variety," W. R. Linton.

Var. *subravusculum* W. R. Linton. Chiefly in river glens, rather common. 1. Ribblehead; mountain-side above Horton, in Ribblesdale. 2. Beazley, Thornton, and other glens near Ingleton. On the Rothay above Sedbergh.

None of these forms have yet been found in Brecon. *H. vulgatum* as an aggregate is very rare in South Wales; but as it has recently been detected both in Herefordshire and Glamorgan (*Riddelsdell*!), it is very likely to occur in Brecon.

H. ACROLEUCUM Stenstr. Yorks, rare or very rare? 1. Ribblehead, a f. Not in Brecon.

H. mutabile, sp. nov. Brecon, locally abundant on hedge-banks and mountain-banks; absent from the Black Mountain. II. Taf Fechan Glen, near Dolygaer; Haffes Glen, Upper Tawe. III. Yscir Glen, near Brecon; Wye Valley at Llangoed; very plentiful in the neighbourhood of Llangammarch. IV. Llanwrtyd and Abergwesyn, abundant; Upper Towy Valley, near Ystrad-ffin. Not in Yorks.

Note.—Dahlstedt would dissociate this plant from *H. acroleucum* Stenstr.; I think rightly.

[*H. angustatum* Lindeb. was the name formerly given to a plant found in the Upper Taf Fechan Glen and Glyn Collwng (see *Brit. Hier.* p. 67); the plant referred to is either *H. nitidum* or *H. cæsium.*]

H. MACULATUM Sm. Yorks, rare; not in Brecon. 1. Giggleswick Scaurs; *F. J. Hanbury*! 2. Ingleborough Scaurs above Dale Beck. Braidey Garth and Keld Head Scaurs, Ingleton, abundantly. Truly native.

H. PINNATIFIDUM Lönnr. Not yet found in Brecon; Yorks, rare? 1. Abundant in a railway-cutting near Ribblehead, 1902.

H. SCANICUM Dahlst. Brecon, abundant and generally distributed, as in most Welsh counties; Yorks, much more rare. I. Darens of the Black Mountain. II. Blaen Taf Fawr; Upper

Tawe Glen, abundantly. III. Mynydd Epynt, at many stations above Llangammarch; Llangoed on the Wye. IV. Abergwesyn on the Upper Yrfon, &c. 2. Thornton and Beazley Glens, Ingleton; Twistleton Scaur.

All the specimens I have seen of this abundant British hawkweed differ from the foreign types (as represented by Dahlstedt's *Exsiccata*, Nos. 73, 74, and 75) by having the panicle-branches rather longer, the lower mostly springing from a lower point on the stem; by having the phyllaries more abundantly clothed with longer glandular hair, and by livescent style. The sum of these differences, if found constant, seems sufficient to justify the giving of a name, which in that case might be var. *anglorum*. British plants belonging to this species differ a good deal in the amount and depth of the leaf-toothing, but little if at all in the clothing of the phyllaries. Large plants have often a panicle subumbellate at the top.

H. IRRIGUUM Fr. Brecon, rare: probably in Yorks. II. Hedge bank Gilwern; limestone rocks Craig Cille; river glen Abercrave, all in 1908.

H. SCIAPHILUM Uechtr. The following is all the information I have available for the type. Brecon: II. Clydach Valley; Craig Gledsiau. III. Wye Valley, at Erwood; hedge-bank near the Priory Church, Brecon; rock at the head of the Yscir Fawr; Llangammarch, plentiful; roadside at Trecastle. IV. Hedge-bank, Llanwrtyd. Yorks: 2. Dent Dale. Probably abundant in both counties.

Var. TRANSIENS, nov. var. More common than the type, and differing from it in the following particulars:—Stem less tall; leaves fewer, broader; stem-leaves 3–5; heads truncate at base; peduncles less bracteolate; phyllaries with fewer hairs; ligules usually naked or only slightly setose in bud.

Standing between *H. sciaphilum* Uechtr. and *H. cacuminatum* Dahlst., this plant resembles the latter in the number and shape of its leaves and in its general aspect, but is best placed under the former on account of the great similarity of head clothing. In *H. cacuminatum* the ligules are always naked; in *H. transiens* usually so; but this character is unreliable.

Abundant in many counties of England and Wales, both in the lowlands and on mountain rocks. Brecon: in all the districts. Yorks: 1. Cowbeck Waterfall, near Settle. 2. Chapel-le-Dale. No doubt general.

Var. *amplifolium* Ley. Brecon, both in the low country and on mountain rocks, not common. I. Taren-llwyd and Bwlch-y-fingel, Black Mountain. II. Govilon and Aberclydach, in the Usk valley. Not in Yorks.

H. strumosum, sp. nov. *H. sciaphilum* Uechtr. var. *strumosum* Ley, *Brit. Hier.* p. 68. Brecon, woods in mountain valleys, rare. I. Woods in the Grwyne Valley, Black Mountain. II. Hepste Glen; plentiful in the Mellte Glen, near Ystrad Fellte, 1908. Not in Yorks.

N.Y. BOT. GARDEN
1910

After watching this plant under cultivation since 1903, I have become convinced that it must be given independent status, and I have reason to believe that Rev. W. R. Linton had arrived at the same conclusion. In habit, as well as in technical characters, it differs much from *H. sciaphilum.*

H. Adlerzii Almq. Brecon, very local; not in Yorks. IV. Abundant in a glen near Llanwrtyd. This plant is said (*Brit. Hier.* p. 69) not to be typical *H. Adlerzii.* After having closely studied it side by side with foreign specimens issued by Dahlstedt (*Exsicc.* No. 85), I have come to the conclusion that it is rightly placed here.

H. septentrionale Arv. Touv. Brecon, locally abundant in river-glens; Yorks, in similar situations, rare. II. Glyn Collwng; Glyn Taf Fechan; on the Hepste and Mellte, near Penderyn, and at Ystrad Fellte; on the Usk at Sennibridge; on the Tawe at Cellwen, abundantly. IV. On the Yrfon near Llanwrtyd and Abergwesyn. 2. Beazley Glen, Ingleton, 1902.

Var. *amphibolum* Lindeb. Hedge-banks and riversides, Brecon, local; absent from Yorks? IV. Banks near Llanwrtyd and near Abergwesyn; river-gravel at Abergwesyn.

Var. simplex, var. nov. Near var. *amphibolum,* but differing as follows:—Stem with 1–3 leaves; height 15 in.–1 foot. Leaves, both radical and cauline, longer petioled, narrower, elliptic-oval, only uppermost sessile; teeth large and coarse. Heads less numerous, mostly 1–3. Peduncles pilose *eglandular*; phyllaries broader, with long hair, and few short inconspicuous glands. II. In the Mellte Glen, South Brecon; first found in 1890, and cultivated since that date. Called by Dr. Lindeberg *H. diaphanum* Fr. var. *stenolepis,* and sent out under that name through the Botanical Exchange Club in 1896. Queried *H. scoticum* F. J. Hanb. by Rev. W. R. Linton, and sent out through the Club in that name in 1904. The place now assigned to it was suggested by Rev. W. R. Linton in 1907, and is certainly right in the writer's judgment. Not found as yet elsewhere.

H. cacuminatum Dahlst. Rare in Britain; I therefore give the whole of its distribution so far as known to me:—*Kent*: Idle Hill, Sunbridge, 1905; *W. H. G.*! *West Gloucester*: Symond's Yat, 1895; *C. Bailey*! *Glamorgan*: Aberdare and Abernant; *Riddelsdell*! *Brecon*: I. On the Upper Honddu, Black Mountain; *W. R. Linton*! II. Aber Clydach; Dyffryn Crawnon, 1896; *F. J. Hanbury*! *Carmarthen*: Railway-bank at Ammanford, 1907. *Merioneth*: Barmouth; *Dr. Mason*! *Carnarvon*: Wood-bank at the Tubular Bridge, 1899, 1904. Precincts of the Cathedral, Bangor, 1905; *A. O. Hume*! *Yorks*: 1. Astolat, near Settle, 1888, 1890; *Miss Thompson*! Teesdale; *Herb. Hanbury*!

Var. *barbareæfolium* Dahlst. *West Gloucester* and *Hereford*: Rocky limestone woods, in both counties, near Symond's Yat. *Brecon*: II. Woods on the Nedd, near Pen Pont.

H. diaphanoides Lindeb. Very rare in Brecon; rare in Yorks.

II. Dyffryn Crawnon, 1908. 3. Byrebank Scaur, Arncliffe; Crook-acre Scaur, Kettlewell.

Var. *divisum* (Jord.) *teste W. R. Linton.* Brecon? rare Yorks, on the scaurs and in the river-glens, rather rare. 1. Smearsett Scaur, Settle, 1888, 1889, 1891; *Miss Thompson.* 2. Beazley Glen, Ingleton, 1902, 1903. II. A plant agreeing well with these Yorkshire plants occurs on a railway-bank at Govilon, and is placed under this variety by Rev. W. R. Linton.

H. DIAPHANUM Fr. Yorks, in river-glens, not common; absent from Brecon. 2. Chapel-le-Dale and Beazley Glen, near Ingleton; Dent Dale; on the Rothay above Sedbergh. 3. On the Upper Wharfe above Buckden. The Yorkshire plant has the two or three first opening heads nearly always crowded, with very short peduncles, with the subsequent secondaries considerably overtopping them.

Var. *præstans* W. R. Linton. Riverside rocks and on limestone scaurs, rather rare. 2. Keld Head Scaur, Ingleton; Dent Dale. Heads larger than in type, not duplicated.

H. PULCHRIUS Ley. Mountain rocks, Brecon, local; not in Yorks. II. Central cliff of the Beacons; Craig Gledsiau; Craig Du; Fan Nedd. On the Fan Fechan Cliff, Carmarthen.

H. DEWARI Bosw. Yorks, rare; not in Brecon. 1. Ribblehead. 2. Chapel-le-Dale; at both stations in small quantity, 1902.

H. cacuminum. *H. demissum* Strömf. var. *cacuminum* Ley, *Brit. Hier.* p. 74. Brecon, very local; not in Yorks. II. Rocks at the head of Glyn Collwng (limestone); Central Cliff of the Beacons; head of Cwm Tarell; Y-fan-Gihirich. Fan Fechan, Carmarthen? First found in 1888. Raised to specific rank in deference to the judgment of Dahlstedt, who writes (1907): "Not at all *H. demissum*, but is a special species."

H. TRUNCATUM Lindeb., f. Brecon, very rare; not in Yorks. II. In the Mellte Glen. This rare plant was brought by me, probably in an undeveloped state, from the Mellte Glen, South Brecon, about the year 1893, and cultivated since that date. I have no wild specimens in my herbarium; it is therefore highly desirable that it should be refound.

H. GOTHICUM Fr. Brecon, rare; Yorks, on the scaurs and on riverside rocks, not common. II. Riverside rocks, Cwm Taf Fechan. 1. Ribble-banks, Stainforth, and Attermire, Settle; *Miss Thompson*! 2. Beazley Glen and Braidey Garth Scaur, Ingleton. Ingleborough, at 1150 ft.; *T. A. Cotton*! 3. On the Upper Wharfe above Buckden.

H. STICTOPHYLLUM Dahlst. var. *serpentinum* F. J. Hanb. Brecon, rather common in river-glens and on mountain rocks; not in Yorks. I. Taren-'r-Esgob, Black Mountain. II. Blaen Taf Fawr; Craig Gledsiau; Blaen Nedd and Fan Nedd; Y-fan-Gihirach; Upper Tawe Glen; Nant Giedd, on the western boundaries of the county. Recurs at Fan Fechan, Carmarthen. Dahlstedt states (*in litt.*, 1907) that the Blaen Nedd plant "does not differ from Scandinavian type"; it is possible, therefore, that both the type

and variety occur in Breconshire. The variety, however, is at best a slight one. Occasionally the leaves are unspotted.

H. SPARSIFOLIUM Lindeb. Type very rare. Brecon: II. Haffes Glen, Cellwen, 1898. Not recorded for Yorks.

Var. *placerophyllum* Dahlst. River-glens, rather rare in both counties. II. Hepste Glen; Upper Tawe and Haffes Glens. III. On the Usk at Sennibridge; on the Yrfon, near Llangammarch. IV. Abergwesyn. 1. Ribblehead. 2. Chapel-le-Dale; Dent Dale. 3. On the Upper Wharfe, near Buckden. Gayle Beck, near Hawes; *Prof. Percival*! Leaves less parallel-sided, more narrowing to base than in var. *grandescens* Dahlst.

Var. *grandescens* Dahlst. As the last; rare in both counties. II. Upper Tawe Glen; Nedd Glen. 2. On the Rothay above Sedbergh. On the Lune, Sedberg; *A. Wilson*!

Var. *lingua* Ley. Brecon, very rare. II. Cwm Haffes; Upper Nedd Glen. This remarkable plant has not yet been detected except in West Brecon.

Var. *strigosum* Ley. Brecon, chiefly in river-glens, but also on rocks and railway-banks, local; not in Yorks. II. Head of Glyn Collwng, abundant; also a form with "stylose" ligules on a dry railway-bank; dry limestone ledges, Dyffryn Crawnon; Mellte, Hepste, and Nedd Glens; head of Glyn Tarell, and on Craig Gledsiau and Craig Du; Upper Tawe Glen. Recurs in the Elan Valley, Radnor.

H. TRIDENTATUM Fr. Brecon. Type rare. II. Roadside, Abercrawnon, Usk Valley. III. Llyswen. Langwith, near York; *Herb. Backhouse*!

Var. *setigerum* Ley. Brecon, locally plentiful in mountain situations. II. Head of Glyn Collwng, Torpantau and Dolygaer in Taf Fechan Glen; Haffes and Tawe Glens, Cellwen.

Var. *acrifolium* Dahlst. Brecon, widely dispersed in the river-glens, occasionally on railway-banks. II. Head of Glyn Collwng, and at Torpantau on the Taf Fechan; railway-bank, Glyn Collwng; Mehascin Glen, near Brecon. III. On the Wye at Erwood; Sennibridge, on the Usk. IV. On the Yrfon at Abergwesyn; on the Upper Towy at Trawsnant and Nant Fanog; on the Lower Elan. Yorks?

Var. DECIPIENS, var. nov. Pseudophyllopodous; stem slightly hairy at base, tall, many-leaved. Leaves efloccose, deeply and sharply tri-polydentate. Heads large; phyllaries dark green with scattered floccum, few hairs, and rather numerous glands. Style dark.

Placed under *H. tridentatum* Fr. on account of its pseudophyllopodous habit. Easily distinguished from type by the large heads, and dark phyllaries quite differently clothed. From var. *acrifolium*, its nearest ally, by its larger heads and dark style. From var. *setigerum* by the nearly glabrous stem, and far sparser clothing of gland and hair on the peduncles and phyllaries, as well as by the taller, more elegant habit. This plant was placed by W. R. Linton as a form under *H. rigidum* Hartm. var. *Friesii*

Dahlst. It differs, however, from this by the efloccose leaves, as well as the pseudophyllopodous habit, of which character the writer has had a good opportunity of judging.

Localities:—*Monmouth*: Near Pont Esgob, Black Mountain; Trelleck. *Hereford*: Very many stations; see *Journ. Bot.* 1907, p. 325. *Brecon*: II. Cefn Cantref; Aberclydach and Llanhamlach on the Usk. III. On the Wye, Erwood; Pontfaen, in the Yscir Valley. *Glamorgan*: Pontsticil, on the Taf Fechan. *Carmarthen*: Glynhir, near Llandebie. *Yorks*: On the Lune, near Sedbergh; *Handley*! Hardraw Force, Wensleydale; *F. A. Lees*!

H. RIGIDUM Hartm. As an aggregate, abundant in Brecon, rare in Yorks; chiefly in river-glens.

Type: *normale* W. R. Linton. Rare in Brecon; absent from Yorks. II. On the Upper Tawe at Cellwen, and above. Found also in Radnor, on the Elan, and in Carmarthen at the Fan Fechan.

Var. *nidense* F. J. Hanb. Brecon, in river-glens at several spots. II. In the Hepste and Mellte Glens at many places. In the Taf Fechan Glen at and above Dolygaer reservoir. In the Tawe Glen above Cellwen. Not yet certainly detected in any other county.

Var. *Friesii* Dahlst. Brecon, not common; Yorks, rare. II. Haffes and Upper Tawe Glens. IV. On the Yrfon at Abergwesyn; rocks in the Yrfon two miles above Abergwesyn. 2. "Ingleborough"; *T. A. Cotton*, 1889, in *herb.* E. F. Linton; good and characteristic.

Var. *trichocaulon* Dahlst. Brecon and Yorks, rare. II. On the Tawe at Craig-y-Nos Castle. IV. On the Cyfnant Fechan in Brecon and Carmarthen. 2. How Gill, Sedbergh; *A. Wilson*!

Var. *scabrescens* Dahlst. In both counties, rare. II. On railway-banks, Glyn Collwng. Penderyn; *teste* Elfstrand! 2. Streamside near Chapel-le-Dale. 3. Hestleton Glen, Arncliffe.

Var. *obatrescens* Dahlst. Brecon, not rare. II. Taf Fechan Glen; in the Senni Valley at Heol Senni; Haffes Glen in the Upper Tawe. IV. Gwrach Glen on the Upper Towy. Not recorded for Yorks.

Var. *calcaricolum* F. J. Hanb. Brecon, very rare. II. Rock in the Tawe near Craig-y-Nos Castle; *Riddelsdell*!

H. PRENANTHOIDES Vill. Brecon, very local; Yorks, widely spread. I. Taren-'r-Esgob, abundant at a single spot. II. Craig Du in the Senni Valley. 1. Stackhouse, near Settle; *Miss Thompson*! Horton, in Ribblesdale. 2. Chapel-le-Dale. 3. Hestleton Glen.

H. STRICTUM Fr. Rare and little known, but occurring as an aggregate in both counties.

Type. Brecon: II. Hepste Glen, 1890; Mellte Glen, 1908. IV. Llanwrtyd, on the Yrfon; *Purchas*, 1890! *teste* Elfstrand; Herb. Hanbury.

Var. *opsianthum* Dahlst. Yorks: 1. Malham, *teste* Elfstrand; *Miss Thompson* in Herb. Hanbury!

Var. *angustum* (Lindeb.). Brecon and Yorks, very rare. IV. On the Yrfon near Abergwesyn, 1888. 1. Malham, rare; *teste* Elfstrand; *F. A. Lees*! (as *H. crocatum* Fr.).

Var. *subcrocatum* Linton. Yorks, rare. 2. On the Lune, Sedbergh; *A. Wilson*!

H. CORYMBOSUM Fr. Brecon, locally abundant in river-glens and on banks in mountain districts. II. Hedge-bank, Torpantau; in the Hepste and Mellte Glens; Cellwen; on the Usk at Sennibridge. III. On the Wye at Erwood. IV. Very abundant on the Yrfon between Llanwrtyd and Abergwesyn; on the Upper Towy; on the Elan near Nant-gwyllt. Yorks, rare? 2. Sedbergh; *Wilson*, 1894!

Var. *salicifolium* (Lindeb.). In both counties, as the type, and nearly as abundant. II. Cwm Taf Fechan; Mellte Glen; on the Tawe at Craig-y-Nos Castle. III. On the Yscir Fechan, near Pontfaen. IV. On the Yrfon, near Llanwrtyd; Gwrach Glen on the Upper Towy. 2. On the Lune, Sedbergh; *Handley*! Middle Moss Dale, Hawes; *T. A. Cotton*!

H. corymbosum × *boreale* was abundant on a hedge-bank at Dolygaer (II) for some years along with both the parents. The hybrid subsequently died out.

H. AURATUM Fr. Yorks, rare; not in Brecon. 2. Chapel-le-Dale. 3. Hestleton Glen.

H. tavense, sp. nov., or sub-sp. nov. *H. rigidum* Hartm. var. *tavense* Ley, *Brit. Hier.* p. 83. The position of this remarkable plant is certainly close to or under *H. auratum* Fr.; and I place it here on the suggestion of Rev. W. R. Linton.

Differs from *H. auratum* in the slender, elegant growth, more numerous narrower leaves, longer erect-arcuate peduncles, which begin at a lower point in the stem, and in the smaller heads with the phyllaries unclothed except with glandular hairs. Peduncles and phyllaries bearing numerous micro-glands. Not yet known from any station except those in the Upper Tawe Glen, Brecon.

H. CROCATUM Fr. Rare in Yorks; absent from Brecon. 2. Moorland streamlet between Chapel-le-Dale and Ribblehead, 1900. On the Lune, Sedbergh, form; *A. Wilson*!

H. SABAUDUM L. As an aggregate common no doubt in both counties. I have no information available respecting the segregates in Yorks. In Brecon the following are at present known:—

H. DUMOSUM Jord.,* agg. II. Hedgerow, Torpantau. Probably common throughout the county.

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* The segregates of *H. sabaudum* L. are thus characterized by Schinz and Keller in their *Flora der Schweiz* (1905), II. Teil:—

A. Heads with long simple hairs, and glands mostly fewer than the hairs. Stem hairy to top, or more or less epilose above. Group *dumosum* Jord.

B. Heads with glands only, or with few hairs intermixed. Group *obliquum* Jord.

C. Stem weakly hairy or glabrescent, glabrous at least in upper part. Heads only glandular, or with very few hairs. Group *virgultorum* Jord.

D. Style golden yellow. Group *quercetorum* Jord.

E. Heads glandless, sub- or quite umbellate; phyllaries broad and obtuse. Group *vagum* Jord.

H. VIRGULTORUM (Jord.), agg. II. Railway-bank at Talybont.
Var. *calvatum* F. J. Hanb. IV. Brecon and Radnor; on the Lower Elan.

H. UMBELLATUM L. Aggregate not very common either in Brecon or Yorks. Type not abundant. II. Mehascin Glen, Brecon. Upper Tawe Glen, Cellwen. IV. At Trawsnant Farm, Upper Towy.
Var. *linariifolium* Wallr. III. Hedge-bank near Llyswen, 1906.
Var. *coronopifolium* Fr. II. By the tunnel mouth at the head of Glyn Collwng, 1892.
Var. *monticola* Arv. Touv. IV. Yrfon at Abergwesyn; Gwrach Glen, Upper Towy; on the Claerwen above its junction with the Elan.
I have no material to work out the distribution of this species in Yorks.

H. OGWENI Linton. Very rare in Brecon; absent from Yorks? II. Mellte Glen, near Ystrad Fellte, 1908.

A NEW *CISSUS* FROM THE TRANSVAAL.

By HARRY BOLUS, D.Sc., F.L.S.

Cissus oleraceus, n. sp. (§ EU-CISSUS *Planch.*). Glaberrimus, ecirrhosus; caulibus pluribus e rhizomate lignoso hypogæo indiviso tuberibus pluribus obpyriformibus; caules annui diffusi procumbentes succulenti simplices vel rarissime ramosi anfracti foliosi in sicco canaliculati vix angulati ad 60 cm. longi, internodiis infimis 0·2 cm. longis, superioribus gradatim longioribus usque ad 0·5 cm. longis. Folia alterna simplicia petiolata stipulata late ovata vel rarius suborbicularia grosse arguteque dentata, crassa carnosa glauca ad 19 cm. longa, 15 cm. lata, penninervia; petiolis crassis 0·5 cm. longis; stipulæ lanceolato-falcatæ 0·8 cm. longæ. Cymæ axillares divaricato-divisæ, pedunculis solitariis rectis erectis nudis ad 16 cm. longis, pedicellis 0·6 cm. longis extremis exterioribusve umbellulatis, fructiferis decurvis. Fructus immaturi 4-spermi, maturi desunt.

Hab. Transvaal, near Potgieter's Rust, District Waterberg. Coll. Mr. Crawley, November, 1908; no. 4728 of the Herbarium of the Transvaal Department of Agriculture.

This plant was first brought to me in 1904 as an apparently dead woody rhizome some 8 or 10 in. long by 2 or 3 in. thick, accompanied by a single detached and dried leaf. Its origin was then unknown except that it came from the Transvaal. As there was no inflorescence I could hardly speculate on its identity, but planted the rhizome in a tub, sheltering it from our prolonged winter rains, so different from the climate of the Transvaal. After some three or four months it was a great pleasure to see several stout shoots emerging from the surface of the soil. These grew

vigorously, and produced leafy stems but without any signs of inflorescence. My friend Mr. Jos. Burtt Davy when on a visit here suggested to me that it might be a *Cissus*. In December of this year he sent me a single leaf upon a woody stump with a detached inflorescence which he had received from the correspondent named above. I saw at once the identity of Mr. Crawley's plant with mine, and was thus enabled to write the foregoing description. The plant has again been transplanted, and is now (spring, 1908) again shooting vigorously, so that I hope yet to get both flowers and fruit at a later period.

NOTES ON THE FLORA OF SUSSEX.—III.

By C. E. Salmon, F.L.S.

(Continued from p. 26.)

Cnicus arvensis Hoffm. var. **mitis* Koch. III. Hove! 1905; E. E. and T. H.—Var. *†*setosus* (Bess.). IV. Near River in Lewes Town, 1906.

Serratula tinctoria L. IV. Haywards Heath Common; H. H.

Centaurea Jacea L. IV. Field, Copyhold, Cuckfield! 1905; D.

C. Scabiosa L. V. Near Beachy Head; W. M. R.

C. Cyanus L. I. West Wittering, 1902.

C. Calcitrapa L. III. Rottingdean; D. V. Pevensey Bay, plentiful! 1905; M. C. Wallsend; H. Friend. Near mouth of River Cuckmere, 1892.

**†C. iberica* Trev. III. Fishersgate, from mill-waste! T. H.

**†C. melitensis* L. I. Bognor! 1904; D.

Cichorium Intybus L. I. Halnaker, 1904.

Picris hieracioides L. var. **arvalis* (Jord.). I. Wood near Cocking! 1907; T. H.

P. echioides L. IV. Near Glynde Pit; H. H. V. St. Leonards; W. M. R.

Crepis taraxacifolia Thuill. III. Withdean! 1902; H. H. *VI. New pastures and sides of cart-roads about Hastings, 1906; E. N. B.

C. biennis L. IV. Ringmer! 1907; T. H.

†Hieracium aurantiacum L. II. Field, Billingshurst, apparently wild! 1907; A. Webster.

H. murorum L. var. *pellucidum* Laestad. The two stations for this, given on page 20 in Journ. Bot. 1906, refer to the same locality.

H. cantianum F. J. Hanb. IV. The plant recorded as *H. rigidum* from Isfield in Journ. Bot. 1901, 414, should be this species according to Rev. E. S. Marshall.

H. tridentatum Fr. VI. Omit the Guestling station in Arnold's *Flora*.—Var. *acrifolium* Dahlst. *II. St. Leonards Forest, frequent! 1907; J. W. White.

**H. sabaudum* L. VII. Near Wych Cross, on the Nutley Road!

1905; R. S. Standen. Differs from the commoner *H. boreale* Fr. by its upper leaves being subcordate at the base, peduncles less dilated, and heads and peduncles clothed with long white spreading hairs.

Hypochæris glabra L. I. Cultivated land near Midhurst, 1907; E. E.

Lactuca virosa L. IV. Roadside between Sheffield Park and Lindfield! 1902; W. E. N. and J. H. A. J. Railway-bank, Newhaven, 1905; E. E. and T. H.

L. muralis Gaertn. I. Linchmere to Fernhurst; W. M. R. VI. Common at Whatlington; H. Friend.

Jasione montana L. IV. Maresfield, locally abundant! 1907; M. C.

Phyteuma spicatum L. *IV. Wood to west of East Hoathly! 1906; G. C. Druce and D. V. Wood near Michelham Priory, Hailsham! 1903; D. Hole Farm, Mayfield; Cooper.

Campanula Trachelium L. III. Abundant round Clayton and Bramber; H. H. IV. By Ouse at Hamsey; H. H.

C. rapunculoides L. *III. When writing in Journ. Bot. 1906, 47, upon the status of this species in Sussex, I had not seen the plant in the Sheepcote Valley, near Brighton. Mr. Hilton pointed it out to me here in 1907, where it grows plentifully on one side of the valley scattered over the downside over many acres. There is a farm-house on the other side of the valley, but it has no garden. The remains of a Roman villa have lately been discovered in an adjoining valley.

Vaccinium Myrtillus L. VI. Between Brightling and Robertsbridge; H. Friend.

Limonium vulgare Mill. V. Between Cuckmere Haven and Exceat Bridge, 1906.

L. humile Mill. I. Pilsey Island! 1839; Hb. Borrer.

Hottonia palustris L. V. Ditches about Coombe Haven, 1895; E. S. Salmon.

Lysimachia Nummularia L. VI. Etchingham, 1877; R. L. Hawkins.

Anagallis arvensis L. var. *carnea* (Schrank). *IV. Cornfields, Newick! 1907; M. C.

Centunculus minimus L. IV. Plashet Wood, Isfield, 1903, and Laughton, 1904; W. E. N. VI. Guestling Wood, 1906; W. E. N.

†*Vinca major* L. III. Roadside, Steyning to Washington, not near a garden, 1904; T. H. V. or VI. Battle, naturalized, 1876; J. H. A. J.

V. minor L. III. Piecombe, 1900; H. H. VI. Large clump beyond Zion Hill, Battle, on road to Whatlington; H. Friend.

Microcala filiformis H. & L. II. Previous to the enclosure of Horsham Common it grew there abundantly; Cooper.

Centaurium umbellatum Gilib. var. *capitatum* Koch. III. Between the road and sea, Roedean! 1905; T. H.

C. pulchellum Druce. IV. Chailey Common, 1906; M. C.

C. capitatum R. & B. IV. Valley north-west of Alfriston, 1906. V. Downs, Jevington, 1906.

Blackstonia perfoliata Huds. I. Between Woodmans Green and the Hollycombe Saw-pits, in copse by path across fields; H. G. B.

Gentiana Amarella L. III. Downs, Bevendean! 1894; and IV. Rottingdean! 1896; T. H.

G. campestris L. IV. Chailey, on clay! 1907; T. H.

**G. baltica* Murb. IV. Newmarket Hill! 1908; and Plumpton! 1908; T. H. V. Downs east of Jevington! 1907; M. C. The Plumpton and Newmarket Hill examples were unmistakable, and the few root-leaves remaining on the Jevington specimens at the date gathered (September) appeared to be those of this species, but the corolla-tube seemed long. Mr. Beeby saw the examples, and said, "I think I should name this *G. baltica* Murb., but I am not certain; the length of the corolla-tube is a somewhat variable character." It would be satisfactory if Eastbourne botanists would examine the plant earlier in the year when good characteristic root-leaves are obtainable.

*†*Symphytum asperrimum* Donn. III. By path from Wiston to Washington! 1905; T. H.

Lycopsis arvensis L. II. Storrington; M. C. *IV. Cultivated land, Telscombe, 1904; T. H.

Myosotis repens Don. I. Midhurst Common, 1902.

M. collina Hoffm. I. North Bersted; M. C. III. Hassocks; H. H.

M. versicolor Sm. III. Henfield and Hassocks; H. H. V. Near Bo-peep and Bexhill; W. M. R.

†*Echinospermum Lappula* Lehm. III. South of Custom House, Kingston-by-Sea! 1885; T. H.

Lithospermum officinale L. III. Bramber and near Saddlescombe; H. H. V. Chalk-bank near Alfriston! 1907; W. E. N.

Echium vulgare L. V. Downs above Ratton, 1907; M. C.

Cuscuta europæa L. III. Saddlescombe, on *Convolvulus arvensis* and *Urtica*! 1886; T. H.

C. trifolii Bab. II. Roadside, Amberley! 1900; T. H.

Atropa Belladonna L. I. Down-slopes near Linch Ball; H. G. B. *III. Newtimber, 1905; T. H. A new and interesting record for this central division of Sussex, and a great extension of its range eastward in the county, being hitherto only known in the extreme west (Division I).

Verbascum Thapsus L. III. Between Shoreham and Bramber; Clayton; H. H. V. St. Leonards; W. M. R.

V. nigrum L. I. Fittleworth; D. Stedham; H. G. B. Near Burton Mill, 1902; and near Warehead Farm, Halnaker, 1904. II. Storrington; M. C. — Var. **tomentosum* Bab. Chichester; W. W. Newbould, Eng. Bot. ed. 3.

**V. Blattaria* L. IV. Near Copyhold, Cuckfield! 1907; D. New to East Sussex.

Linaria minor Desf. V. Bexhill; Nat. Hist. Hastings Supp. 1, 1883.

L. repens Mill. See Journ. Bot. 1906, p. 49. Mr. Britten informs me that he considers the plant native in the Lodsworth Common station.

†*Mimulus Langsdorffii* Donn. *IV. Moated house at Plumpton! 1906; W. E. N.

Veronica montana L. V. St. Leonards; W. M. R. Plentiful about Netherfield and Great Park Farm, Battle, 1895; E. S. Salmon.

V. scutellata L. II. Leechpool, St. Leonards Forest! 1907; A. B. C.

Euphrasia Kerneri Wettst. III. Standean! 1904; T. H.

**E. borealis* Towns. IV. Newmarket Hill! 1903; T. H. New to Sussex.

E. gracilis Fr. III. Dyke Hills! 1904; T. H. IV. Newmarket Hill! 1905; T. H.

**E. curta* Wettst. var. *glabrescens* Wettst. III. Shoreham Beach! 1903; T. H.

Bartsia viscosa L. V. Near the High Woods, Bexhill, in abundance, 1908; A. B. C. I saw it sparingly there in 1895.

Rhinanthus major Ehrh. *IV. One plant in a hay-field, Copyhold, Cuckfield! 1905; D.

Orobanche major L. VII. On broom near Nutley; W. E. N.

O. amethystea Thuill. V. Near Eastbourne; Mrs. Jones. Watson, Cyb. Brit. 3, 475, 1852.

Utricularia major Schmidel. V. Marsh between gasworks and town, Eastbourne, 1891; C. J. Packham. Specimen seen by A. Bennett, and recorded for the vice-county in Journ. Bot. Supp. 1905, 67.

Origanum vulgare L. VII. Frequent near Tilgate; E. E.

Calamintha Acinos Clairv. I. Midhurst, 1902.

C. montana Lam. (*C. officinalis* Moench). VI. Omit the "Castle Hill, Hastings," locality for this in Arnold's *Flora*. The Rev. E. N. Bloomfield sent me a specimen, and it proved to be *C. Nepeta* Savi, which is already on record from this place.

†*Salvia verticillata* L. *V. Shingles, Eastbourne! 1905; T. H.

Nepeta Cataria L. III. Withdean, once; H. H.

Scutellaria galericulata L. III. Ditchling Common; H. H. IV. Chailey Common; H. H. VII. Bewbush Mill-pond, 1902.

S. galericulata × *minor*. *III. Ditchling Common! 1905; E. E. and T. H. An interesting hybrid similar to the Virginia Water form. It has been found before in Sussex by W. Whitwell at VII. Broadwater Forest (Rep. Bot. Rec. Club, 1884–6, p. 131).

S. minor Huds. I. Redford Common; H. G. B. II. Chiltington; M. C. IV. Copyhold, Cuckfield; D. VII. Buckhurst Park, 1904.

(To be concluded.)

BOTANICAL SYNONYMS IN THE *DESMIDIACEÆ* AND *PROTOCOCCOIDEÆ*.

By G. S. West, M.A., D.Sc., F.L.S.

A recent publication by M. Ch. Bernard on the *Desmidiaceæ* and *Protococcaceæ* of Java* cannot be passed over without somewhat severe criticism.

The inaccuracy of many of the figures and the absence of many necessary side and vertical views in the illustrations of Desmids are unfortunately features which are only too common in the publications of modern writers on these plants. The whole paper is in itself conclusive evidence that the author is not acquainted with the commonest and most ubiquitous species of Desmids. He does not appear to have consulted even that fundamental work, Ralfs' *British Desmids*, let alone the more recent Monograph, nor does he seem acquainted with any of the papers dealing with the Algæ of Tropical Africa, or Borge's contributions to the Algæ of South America. Neither has he seen the paper dealing with the Alga-flora of Koh Chang in the Gulf of Siam,† nor the recent extensive publication on Burmese Algæ,‡ although these are obviously of the greatest importance in relation to the Alga-flora of Java.

In some instances M. Bernard even describes under new names species which have been well known for the past sixty years! Most of the remarks under the various species recorded only tend to emphasize the author's ignorance of Desmids, and his comments upon the cosmopolitanism of this family are therefore of little value.

As one might expect, M. Bernard repeatedly misinterprets the fibrillar structure of the enveloping mucus of Desmids. It is a curious fact that the inexperienced writer on the *Conjugatæ*, who is permitted to publish work which has been inadequately supervised, invariably describes part of the enveloping jelly so characteristic of many of these plants as a covering of spines.

The following comments refer to the so-called "new species" described and figured by M. Bernard :—

Microcystis minima Bern. (p. 49, f. 10–13). The author does not indicate how it is possible to separate this "species" from *M. ichthyoblable* Kütz.

Anabæna helicoidea Bern. (p. 52, f. 24–26) appears to be one of the common spirally twisted species of the genus.

Gymnozyga cylindrica Bern. (p. 54, f. 29) = a species of *Hyalotheca*, and probably only a form of *H. neglecta*.

Spirotænia raphidioides Bern. (p. 58, f. 36, 37) is only a form of *S. minuta* Thur. *Cf.* Lütkem. in Oesterr. Botan. Zeitschr. 1903, no. 10, t. 11.

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* Ch. Bernard, *Protococcacées et Desmidiées d'eau douce, recoltées à Java*, Département de l'Agriculture aux Indes Néerlandaises, Batavia, 1908.

† W. & G. S. West in *Botanisk Tidsskrift*, xxiv. 1901.

‡ W. & G. S. West in *Ann. Roy. Botan. Gard. Calcutta*, vol. vi. pt. ii. 1907.

Closterium Koernickei Bern. (p. 67, f. 62, 63) and *C. bogoriense* Bern. (p. 68, f. 67) are only forms of *C. Venus* Kütz.

C. garoetianum Bern. (p. 69, f. 68) is but another form of *C. Venus*.

Penium elegans Bern. (p. 73, f. 76) is absolutely typical *Netrium Digitus* (Ehrenb.) Itzig. & Rothe, a Desmid which is ubiquitous in all climates.

P. Chodati Bern. (p. 74, f. 77–79) is merely a common form of *P. margaritaceum* (Ehrenb.) Bréb., another ubiquitous Desmid.

Docidium fenestratum Bern. (p. 75, f. 80–82) is one of three things. It may be a form of *Pleurotænium verrucosum* (Bail.), *P. tesselatum* (Josh.) Lagerh., or *P. trochiscum* W. & G. S. West. The latter is known in detail from both the eastern and western hemispheres, but the two former require careful investigation. Bernard's "*Docidium fenestratum*" merely adds to a confusion which already exists.

Xanthidium orbiculare Bern. (p. 86, f. 113). This is typical *Cosmarium obsoletum*, the author having described the fibrillar structure of the enveloping jelly as an armature of spines!

X. tropicum Bern. (p. 88, f. 115) = *X. subtrilobum* W. & G. S. West (1897).

Cosmarium ? dubium Bern. (p. 91, f. 121). It is doubtful if this plant can ever again be identified from the description and figure given by M. Bernard. He had need call it *Cosmarium dubium !*

Cosmarium spinulosum Bern. (p. 91, f. 122) = *C. bioculatum* Bréb. (1848), in which the gelatinous envelope so common in this species has been represented as a covering of small spines! This species is common in every country in the world which has been botanically investigated.

C. javense Bern. (p. 111, f. 171). This is very likely identical with a Burmese species recently described as *C. glaphyronotum* W. & G. S. West (1907), but M. Bernard's figure is not very good, and only the front view is given.

C. crassidentatum Bern. (p. 112, f. 174). Very doubtful, and the figure is quite insufficient for any future recognition.

Euastrum subansatum, Bern. (p. 122, f. 199–201) = *E. ansatum* Ralfs (1848) in its most typical form!

E. tropicum Bern. (p. 123, f. 202, 203) is also a form of *E. ansatum*.

Micrasterias inflata Bern. (p. 141, f. 238). This is one of the tropical forms of *Micrasterias Mahabuleshwarensis* Hobson.

Staurastrum formosum Bern. (p. 142, f. 239–240) = *S. ensiferum* Turn. (1893).

S. Joshuæ Bern. (p. 146, f. 249, 250) = *S. alternans* Bréb. (1848).

S. Elyanum Bern. (p. 149, f. 262, 263) = *S. senarium* (Ehrenb.) Ralfs (1848).

S. Ernstii Bern. (p. 156, f. 280–289) = form of *S. tetracerum* Ralfs.

Tetraspora bogoriensis Bern. (p. 158, f. 290) = *Selenoderma Malmeana* Bohlin (1897).

Raphidium Turneri (West) Bern. (p. 176, f. 376–379) = *Ankistrodesmus falcatus* (Corda) Ralfs var. *spirale* (Turn.) G. S. West (1904).

R. angustum Bern. (p. 177, f. 380–384) = *Ankistrodesmus falcatus* (Corda) Ralfs var. *spirilliformis* G. S. West (1904).

Kirchneriella major Bern. (p. 179, f. 398, 399) = *K. lunaris* (Kirchn.) Moebius!

Steiniella Graevenitzii Bern. (p. 189, f. 463–466) = *Dimorphococcus* sp.

Sorastrum indicum Bern. (p. 199, f. 531, 532) has not the structure of a colony of this genus, and appears to be identical with *Selenastrum bifidum* Bern. (1887).

Peridinium javanicum Bern. (p. 210, f. 575, 576). This is quite indeterminable from the author's figures, which might apply equally well to several described species!

In addition to the above many of M. Bernard's determinations are inaccurate. The following are some of them:—

C. prælongum forma *brevior* Nordst. (Bern. p. 62, f. 46, 47). This does not represent any form of *C. prælongum* Bréb.

C. acutum (Bern. p. 63, f. 48, 49) = *C. pronum* Bréb.; figs. 50 and 51 are forms of *Ankistrodesmus falcatus* var. *acicularis*.

C. Jenneri (Bern. p. 66, f. 58) is not *C. Jenneri* Ralfs (1848).

C. Leibleinii (Bern. p. 70, f. 70) = *C. moniliferum* (Bory) Ehrenb. (1838).

Penium Navicula Bréb. var. *maximum* Bern. (p. 71, f. 73) is identical with *P. Libellula* (Focke) Nordst. var. *intermedium* Roy & Biss (1894).

P. lamellosum Bréb. var. *minus* Bern. (p. 72, f. 75) = *Netrium Nägelii* (Bréb.) W. & G. S. West.

Pleurotænium rectum (Bern. p. 79, f. 88, 89). This is not *P. rectum* Delp. (1877), which is only a small straight form of *P. Trabecula* (Ehrenb.) Näg.

P. Ehrenbergii (Bern. p. 79, f. 90–93) = *P. Trabecula*.

P. Ehrenbergii var. *granulatum* (Bern. p. 80, f. 94) = form of *P. Trabecula*.

P. ovatum Nordst. var. *læve* Bern. (p. 85, f. 105) = *P. ovatum* var. *tumidum* Mask. (1889).

Pleurotæniopsis subturgida (Turn.) Schmidle forma *minor* (Bern. p. 85, f. 106, 107). These forms are much too deeply constricted for *Cosmarium subturgidum*, and should be referred to *C. javanicum* Nordst.

Cosmarium zonarium W. & G. S. West var. *latius* Bern. (p. 89, f. 118) = *C. pseudoconnatum* Nordst. var. *ellipsoideum* W. & G. S. West (1902).

C. moniliforme (Bern. p. 90, f. 119). Figure insufficiently exact, but not *C. moniliforme*.

C. venustum (Bréb.) Arch. var. *brevius* Bern. (p. 92, f. 123–125). This has no near affinity with *C. venustum*.

C. Botrytis (Bern. p. 96, f. 132, 133). This is not *C. Botrytis* Menegh., which is perhaps the most widely distributed Desmid in the whole world.

C. conspersum (Bern. p. 97, f. 136). M. Bernard's figure has no relationship whatever with *C. conspersum* Ralfs, and this determination almost more than any other shows the author's complete ignorance of the systematics of the *Desmidiaceæ*.

C. æquale (Bern. p. 100, f. 141, 142). Not *C. æquale* Turn. but *C. pseudoprotuberans* Kirchn. var. *angustius* Nordst.

C. Scenedesmus Delp. var. *punctatum* (Bern. p. 102, f. 147) = *C. obsoletum*, with the fibrillar jelly represented as short spines.

C. granatum (Bern. p. 104, f. 150) = *C. retusiforme* (Wille) Gutw. !

C. microsphinctum Nordst. forma *parvulum* (Bern. p. 104, f. 151) = *C. granatum* Bréb. !

C. subtumidum Nordst. var. *angustius* Bern. (p. 105, f. 152, 153) = *C. pseudopyramidatum* Lund.

C. nitidulum (Bern. p. 106, f. 154). Whatever this may be it is not *C. nitidulum* De Notaris.

C. ellipsoideum (Bern. p. 106, f. 155). Most likely either a form of *C. sexangulare* Lund. or *C. sulcatum* Nordst., but the figure is insufficient to determine the point.

C. pyramidatum "Nordst." (Bern. p. 107, f. 158, 159) = the large variety of *C. pseudonitidulum* so common in tropical countries, and recently placed as var. *validum* (*cf.* W. & G. S. West, Monogr. Brit. Desm. ii. 1905, p. 196, t. 63, f. 27–30).

C. pseudotaxichondrum (Bern. p. 109, f. 163). There is not the slightest evidence to show that M. Bernard's figure belongs to this species.

C. Regnesi Reinsch var. *minimum* Bern. (p. 109, f. 164, 165). This is one of the very commonest forms of *C. Regnesi*, a species which is often of less dimensions than any of the author's measurements.

C. porrectum (Bern. p. 115, f. 180). It is quite evident that M. Bernard has never seen any of the published figures of *C. porrectum* Nordst., and that he must have misinterpreted all the published descriptions !

C. auriculatum Reinsch var. *bogoriense* Bern. (p. 116, f. 181, 182) = *C. subauriculatum* W. & G. S. West (1895).

C. pygmæum (Bern. p. 117, f. 185–188). The author's figures are exceedingly poor and possibly include several species, but none represent *C. pygmæum* Arch. !

C. pseudoprotuberans Kirchn. var. *angustius* (Bern. p. 118, f. 189, 190) = *C. angulosum* Bréb.

Euastrum dideltoides W. & G. S. West forma *Borgei* Gutw. (Bern. p. 121, f. 198) = typical *E. Didelta* (Turp.) Ralfs (1848).

E. spinulosum Delp. and varieties (Bern. p. 126–130, f. 207-211). All the author's figures are forms of var. *inermius* Nordst., and had the author examined the forms of this species which occur in the tropics of both the New and Old Worlds he would not have made the observations on pp. 126–130.

E. binale (Turp.) Ralfs var. *javanicum* Bern. (p. 130, f. 215, 216) = *E. crispulum* (Nordst.) W. & G. S. West forma.

E. elegans (Bréb.) Kütz. var. *brevius* Bern. (p. 131, f. 217, 218) has no relationship whatever with *E. elegans*.

Micrasterias foliacea Bail. (Bern. p. 133–135, f. 220–223). M. Bernard's figures are erroneous, and his remarks absurd, in view of the accurate figures and complete description of the apical attachment of the cells given by Johnson in Bot. Gazette, xix. 1894, p. 56–58, t. 6, f. 1–4.

M. Crux-Melitensis (Ehrenb.) Hass. var. *bogoriense* Bern. (p. 139, f. 233) is identical with the form described by Turner in 1893 as *M. radians*.

Staurastrum dejectum Bréb. var. *patens* (Bern. p. 143, f. 241) = *S. dejectum*, type.

S. bidentatum Borge var. *simplex* Borge forma *trigona* Wild. (Bern. p. 146, f. 253–256). This is most probably a form of *S. striolatum* (Näg.) Arch.

S. javanicum (Nordst.) Turn. var. *maximum* Bern. (p. 151, f. 264–267) = a form of *S. Manfeldtii* Delp.

S. proboscideum "(Bail.) Arch." (Bern. p. 152, f. 268, 269) = *S. Sonthallianum* Turn.

S. margaritaceum (Ehrenb.) Menegh. var. *hirtum* Nordst. (Bern. p. 154, f. 275, 276). This is not a form of *S. margaritaceum*.

Kirchneriella lunaris (Kirchn.) Moeb. (Bern. p. 178, f. 392–397) = *K. subsolitaria* G. S. West (1907).

Scenedesmus obliquus forma *intermedius* Bern. (p. 182, f. 417–419) and also *S. acuminatus* as figured by Bernard (p. 183, f. 422) are both *S. obliquus* f. *dimorphus*.

S. denticulatus Lagerh. var. *diengianus* Bern. (p. 185, f. 448) = *S. denticulatus* var. *linearis* Hansg.

Polyedrium regulare "(Kg.) Chod." (Bern. p. 192, f. 471, 472, 474) = *Tetraëdron trigonum*.

At the end of the paper the author states that difficulties connected with the literature of the subject prevented him from giving his attention to the Javanese Diatoms. One cannot help being sorry that he did not arrive at the same conclusion concerning the other groups of Algæ!

It is both astonishing and distressing that a paper displaying such ignorance of the systematics of the groups dealt with should be allowed to emanate from an institution of the standing of the Botanical Gardens at Buitenzorg.

BOTANICAL EXCHANGE CLUB REPORT, 1907.

[The Report of the Exchange Club for 1907 by the editor and distributor, the Rev. H. J. Riddelsdell, is, as has been usual in recent years, prefaced by a "report of the Treasurer and Secretary," Mr. G. C. Druce, which contains a summary of "the chief items of interest in British Botany of the year 1907." Among the plants appearing under this heading the following are of interest; some among them throw light on certain names which, so far as we are aware, appeared for the first time in Mr. Druce's *List of British Plants* as *nomina nuda*:—

"*Cerastium vulgatum* L. var. *obtusum* Druce. A tall rigid plant with clustered cymes, short capsules, and shorter, broader and less acuminate sepals. St. Aubin's, Jersey." This is distinguished by the above description in Journ. Bot. 1907, 400, but is not there named.

"*Trifolium pratense* L. var. *americanum* Harz. Pointed out by Dr. Domin; it is a robust plant with a copious patent pubescence on the stems, and appears to be widely distributed. It is what I recorded as var. *expansum* from Forfar in Ann. Scot. Nat. Hist."

"*Potentilla verna* × *Crantzii*. Fairly intermediate, with larger blossoms than *verna*. On the limestone at Grassington, Yorkshire, whence both species are recorded. June, 1906."

"*Saxifraga hypnoides* × *tridactylites* = *S. Farreri* Druce. Discovered by Mr. Reginald Farrer on Ingleborough, and showing evidence of both parents. I saw *S. tridactylites* growing near the locality where Mr. Farrer gathered it. He has it in cultivation at his rock-garden at Clapham, Yorks."

"*Orobanche minor* Sm. var. *conciliata* (Beck as forma). 'Corolla excepta basi alba amethystino-violacea, squamæ calycis cum cauli purpurascentes.' Miss M. C. Murray. Ann. Scot. Nat. Hist. p. 253, 1907." The diagnosis quoted was sent to Miss Murray by Dr. Beck, who is monographing the genus, and who recognized the plant as "an unusual form of *O. minor*" (*op. cit.*). Mr. Druce raises Dr. Beck's "forma" to varietal rank.

"*Ulmus sativa* Mill. var. *Lockii*. A graceful tree with small rather narrow leaves, and very distinct habit. Is frequent about Fineshade and other parts of Northamptonshire, and is known there as Lock's Elm."

"*Deyeuxia strigosa* Kunth. This (as I suggested in the *British Plant List*) must be now removed from our British species. The Caithness plant which I have collected in all its known localities must be referred *teste* Prof. Hackel to *D. neglecta* Kunth. The true *strigosa* is now usually considered to be *D. neglecta* × *Calamagrostis epigeios*. The latter species does not now occur in North Scotland."

The present Report contains a number of interesting notes, including some of unusual length which we think might advantageously have appeared in pages more generally accessible to foreign botanists and to those who are not members of the Club: those on *Cnicus tuberosus*, *Scirpus carinatus*, and *Luzula pallescens* (of which we hope shortly to give an account and figure) may be mentioned as examples of this. There are also some which suggest that considerable uncertainty still prevails as to some of our commoner plants; to these we may possibly recur. It will also be seen that much divergence of opinion exists as to the status of certain forms which have been raised to varietal rank.

There are also certain matters connected with nomenclature which seem to require comment, although none is made: *e. g.* the creation by Mr. Ewing of a "var. *alpigena* mihi non Fries" of *Carex vesicaria*. If, as the writer and commentator seem to imply,

the var. *alpigena* Fries is still recognized, it is difficult, or rather impossible, to understand on what ground the same name can be applied to another variety of the same species.

The Report is published by Messrs. James Parker & Son, Oxford, price 2*s*.—Ed. Journ. Bot.]

Ranunculus acris L. var. tomophyllus Rouy et Fouc. = R. tomophyllus Jord. (*pro specie*). Pastures about Failand and Portbury, N. Somerset, July, 1907. My friend Cedric Bucknall has joined me in a diligent endeavour to identify the forms of *R. acris* that grow about Bristol, with the idea of arranging them nnder the segregates described by Jordan and other Continental botanists. Many gatherings have been made in every kind of situation, with care to secure representative roots, leaves, and fruit. The specimens have been repeatedly examined and compared with descriptions, and also with such collections—by no means complete—as are contained in our National Herbaria. The result of this work—chiefly undertaken by my friend—stated shortly, is that we cannot consider any of the variations worthy to rank as distinct species. Of "subspecies" I say nothing, for I have never been able to form a mental picture of that entity. As happens with other groups of critical plants, our British forms of *R. acris* cannot often be precisely collated with those known to grow on the Continent. A few certainly agree fairly well with one or other of them, and a larger proportion can be named more or less uncertainly; but in the majority of cases puzzling cross-affinities are found to obtain, so that the plants cannot be allotted to any named variety, and sometimes not even to a particular section. The best that can be said of many of these *tomophyllus* specimens is that they are nearer to this than to anything else. Although sometimes classed as a secondary form under *Borœanus*, in its extreme state this plant is as far removed from the latter as from either of the other segregates.—James W. White. Yes, well marked; but would it not be better to subordinate it to *R. Borœanus* as var. *tomophyllus* (Jord.) Towns., as was done by Mr. Townsend in Journ. Bot.? [1900, 301]. *R. Borœanus* and *tomophyllus* are connected by many intermediate forms, and are not even *subspecifically* distinct.—J. A. Wheldon.

R. acris L. subsp. Borœanus f. rectus Rouy et Fouc. = R. rectus Boreau (*pro specie*). Pastures near Axbridge, North Somerset, June 28th, 1907. This form is rather common about Bristol, ranking in frequency next to *tomophyllus*, as far as can be judged at present. In England it seems difficult to lay hold of a character much relied upon by authors for the diagnosis of these plants, *viz.* the direction of the rootstock, whether oblique, horizontal, or vertical. On Continental specimens, however, I have seen roots such as I have never met with at home. Unless the plant grows in sand, peat, or similar loose soil, its root must obviously be liable to deflection by obstructions in its path, and the root-character will therefore be often obscured when a thin layer of earth overlies rock; or on stony roadsides. Nor does the

rootstock take a direction in line with the aerial stem when plants spring from ditch-banks or other sloping ground. Thus one finds it difficult to make out clearly those forms which differ little from each other, save in the direction of their rootstocks, e. g. *Steveni* and *rectus*, which are instanced by Townsend; and the same hindrance lies in the way of a decision on many doubtful gatherings.—JAMES W. WHITE.

TILIA CORDATA Mill. Swithland Wood, August 7th, 1907. Hitherto this has been recorded under *parvifolia*, but at nearly all the stations it is known to have been planted, so that the indigeneity of *Tilia cordata* in Leicestershire has been locally questioned. Professor A. G. Tansley and Dr. Moss, who were here with the British Association, state that, "judging from the ground flora, *Tilia cordata* is undoubtedly indigenous at Swithland."—W. BELL. This differs from all the other limes in having an erect, not drooping, inflorescence, a character not mentioned in the books.—A. B. JACKSON.

POTENTILLA ERECTA Hampe var. SCIAPHILA (Zimm.). *P. Tormentilla* Neck. var. *sciaphila* Asch. & Gr. Syn. vi. 838 (1904). Sandy, ericetal places, Richmond Park, Surrey, August 28th, 1907, leg. A. B. Jackson & K. Domin. This well marked variety has only hitherto been recorded from East and West Cornwall by Mr. Davey (see *Watson Exchange Club Report*, 1905–06, p. 50), and from heathy hills of the rolled pebbles of the Thanet sands (*B. E. C. Report*, 1905, p. 167); but an examination of the material preserved under the name *Potentilla Tormentilla* Neck. (= *P. silvestris*) at the British Museum and Kew shows that the variety is of fairly general distribution in Britain. It may be distinguished from the type by its smaller, prostrate habit, the stems short, not more than four inches in length, slender flaccid leaves shortly petiolate, stipules small, entire or toothed only at the apex, leaflets obovate lanceolate, with only one or two teeth at the leaf apex, not deeply toothed as in the type, flowers small on long slender pedicels, leaflets of the epicalyx only half the length of the calyx. Dr. Domin considers that the occurrence of this variety in England is interesting from a phyto-geographic point of view. On the Continent it is very rarely found except in the Alps, though a plant coming near the variety occurs in S. Bohemia (Domin) and Dresden (Wolf). The Richmond specimens agree very well with Cornish examples collected by Mr. Davey and named by Dr. Wolf, the monographer of the genus.—A. B. JACKSON. I fail to see why this should be called a *variety*; to me it appears to be only a starved *state*, which is common enough in such situations.—E. S. M. In the total absence (in the specimens I received) of the characteristic root-leaves, and in the absence of the compactness which Mr. F. H. Davey and I take from Mr. A. Bennett to be the chief features of this variety, it is impossible to accept this as Zimmeter's var. *sciaphila*.—C. C. VIGURS.

EPILOBIUM LANCEOLATUM × ROSEUM? Waste ground by the Rea Brook, Meole Brace, Shropshire, August, 1907. Concerning

this, the Rev. E. S. Marshall, to whom I submitted specimens, and for whose verdict I am very grateful, writes as follows:—"A very puzzling hybrid—one parent is certainly *E. roseum*, which predominates in the inflorescence. The long-stalked, irregularly toothed stem-leaves favour *E. lanceolatum* as the second factor, and I believe that it is most probably a narrow-leaved *lanceolatum* × *roseum*. At first I thought that it might be a cross with *E. tetragonum* Curt. (*adnatum* Grisebach), but that hybrid would not produce such long petioles in such irregularly shaped foliage. I am, however, not yet quite certain about the proposed determination; it is a most difficult plant.—E. S. M. I carefully examined the *Epilobia* of the immediate neighbourhood. *E. roseum* Schreb. was present, in cultivated ground, but quite rare. *E. montanum* L. everywhere abundant; while by the banks of the Rea Brook were *E. hirsutum* L. in profusion, also coming up as a weed away from the water-edge, and *E. parviflorum* Schreb. not abundant. No sign of *E. lanceolatum* S. & M., one of the supposed parents of the hybrid, has yet been observed, nor *adnatum* Griseb., but I contemplate searching the ground more minutely this forthcoming year.—J. Cosmo Melvill. This name was suggested by me for the only specimen which I had previously seen. . . . If it is (as I believe) a hybrid, *E. roseum* is certainly one parent (note the glandular shoot and shrunken capsules, small *roseum*-like flowers, long-stalked lower leaves, etc.). Mr. Melvill tells me that *E. roseum* occurs sparingly close by, but that he has seen neither *E. tetragonum* Curt. (*adnatum* Griseb.) nor *E. lanceolatum* anywhere near. The shape and irregular toothing of the leaves (which also show no tendency to be adnate-decurrent) are strongly in favour of a *lanceolatum* origin, besides some other points. I have seen specimens of *E. lanceolatum* from Yorkshire, which is further north.—E. S. Marshall.

Galium ochroleucum Syme non Kit. = G. vero-mollugo Wallroth: G. decolorans Grenier et Godron. Grassy roadside waste, Failand, North Somerset, August 10th, 1907. Growing with *G. verum* and *G. Mollugo*, these plants certainly appear to be the result of crossing between those species. The several patches produce stems varying in character and tint of flowers; some favouring one parent and some the other. At the end of September, gatherings showed only abortive ovaries. I could not find a single good fruit. The specimens agree well with examples gathered abroad; but I have sometimes doubted if the Continental plant be really a hybrid, for it is of general distribution in Southern Europe, and often grows where neither of the supposed parents can be seen. I have not, however, had an opportunity of searching for fruits in late summer.—James W. White. Yes; *G. Mollugo* × *verum*, decidedly on the *verum* side. I have gathered a similar form in West Sussex.—E. S. M.

Trachelium cæruleum L. Naturalized on a wall in St. Peter's, Guernsey, but doubtless only an escape from the neighbouring garden. July, 1906.—G. Claridge Druce. [Recorded by Mr. Melvill from this locality in Journ. Bot. 1892, 346, at

which period it was abundant and "had been there for very many years."—Ed. Journ. Bot.]

Melampyrum arvense L. This interesting addition to the Oxfordshire flora was discovered by Mr. W. Evetts, of Tackley, in a cornfield, and also in a field of clover between Tackley and Steeple Aston. It is in small quantity, September, 1907.—G. Claridge Druce.

Fagus sylvatica L., var. I send out this as a somewhat remarkable leaf variety. Leaves uniformly much smaller, thicker, with veins on the under side much impressed; thicker and less sticky to the touch than in type. Small, very fructiferous trees on the north ridge of Moel-y-golfa, Montgomery, July 18th, 1907.—Augustin Ley.

Asphodelus fistulosus Linn. Frequent in the sandhills about Devonshire Road, St. Anne's-on-the-Sea, North-west Lancashire, v.-c. 60, July 20th, 1907. The species did not mature its fruits, as it did in 1906 on the Orchard Road site.—Charles Bailey.

Muscari racemosum Mill., Lam., and DC. Near Kiddington, Oxfordshire, where it was discovered by Capt. Gaskell. I think there is little doubt that it is a genuine native. Its habitat is a large pasture ground in an upland situation, and the plant is so abundant as to give a distinct colour to the place. There are no ornamental grounds nearer than Ditchley Park, and it is not at all likely to have been brought from that place.—G. Claridge Druce.

Scirpus carinatus Sm. (S. lacustris × triqueter). Mud-banks by the Thames between Kew and Hammersmith, August and September, 1907.—A. B. Jackson and K. Domin. This bulrush forms a conspicuous feature of the riverside vegetation on the Surrey side of the river, but is somewhat difficult of access even at low tide owing to the mud-banks which surround it. After examining a large number of specimens *in situ*, and comparing it with its associate, *S. triqueter*, which, however, occurs in much less quantity, we are convinced that it is a hybrid (*S. lacustris* × *triqueter*), as suggested by Rev. E. F. Linton (Journ. Bot. 1907, 301). The stems are always taller than *S. triqueter* but more slender than *S. lacustris*, the lower part round, the upper part obtusely triangular. In extreme forms which approach *S. lacustris* we observed that the stems in the upper half were only very slightly angled with very obtuse sides, or nearly round, but never quite circular as in the common bulrush, *S. lacustris*. Other plants evidently nearer *S. triqueter* have stems triangular from the base, with occasionally one angle subacute, leaves with or without lamina, inflorescence compact or with the spikelets on elongated branches and evidently pedicelled; hypogynous bristles mostly equalling the ovaries, anthers glabrous or shortly ciliate, styles 2 or 3. Pollen often ill-developed. The essential characters of the hybrid and assumed parent may be contrasted as follows:—

S. triqueter.	*S. carinatus.*	*S. lacustris.*
Flowering-stems acutely triangular about 3 ft. high.	Flowering-stems terete below, obtusely triangular above, 3–6 ft. high.	Flowering-stems stout, terete, 6–10 ft.
Leaves reduced to a sheath, lamina not developed.	Leaves with or without lamina.	Leaves with lamina more or less developed.
Spikelets two to many, sessile, and compact at the apex of elongated branches.	Spikelets varying in number, sessile, or on elongated branches.	Spikelets never sessile, often long pedicelled.
Hypogynous bristles equalling or a little shorter than the nut.	Hypogynous bristles mostly equalling the ovaries.	Hypogynous bristles equalling or slightly exceeding nuts.
Anthers glabrous.	Anthers glabrous or shortly ciliate.	Anthers fringed at apex.
Styles 2.	Styles 2–3.	Styles 3.

The character of the nuts we do not mention as nearly all the spikelets of *S. triqueter* and *S. carinatus* were found to be barren. In the case of *S. triqueter* this sterility may have been due to an abnormal season. Jackson found well-developed nuts in one or two spikelets of *S. carinatus*, and these were convex on the back, as described in Babington (*Manual*, ed. 9, 450), and quite different in shape from those of *S. lacustris*, correctly described as bluntly trigonous. Some forms of this hybrid bulrush much resemble *S. lacustris*, but they are always more slender than in that species, with the other characters exactly intermediate, as described above. The apparent absence of *S. lacustris* from the area covered by *S. carinatus* may be considered by some as a point against its hybrid origin, but it will be well to point out that *S. lacustris* has been recorded from Strawberry Hill, which is some miles west of the above-mentioned locality. Having regard to the fact that both the assumed parents do not grow in close proximity, it is of course possible to regard *S. carinatus* as a secondary hybrid. These secondary hybrids in the course of generations often simulate good species, and may even become so; as, for instance, *Potentilla aurulenta*, which has arisen from the primary hybrid combination, *P. verna* × *opaca*. *Scirpus carinatus* has not advanced so far, but its great variation is a sufficiently clear indication of its hybrid origin. It is interesting to note that *S. carinatus* and *S. triqueter* are associated on the banks of the Arun, near Amberley, Sussex, and by the Tamar, near Calstock, Cornwall. I am unable to ascertain whether *S. lacustris* grows near Amberley, but it is not recorded from the banks of the Tamar in Davey's list of Cornwall plants.—A. B. Jackson and K. Domin.

Agrostis tenuis Sibth. var. pumila (Linn.). Yeldersley Fields, South Derbyshire, wild, 1906; the same cult., August, 1907. It is, I imagine, well known, since Mr. E. S. Salmon's investigations,

that *A. pumila* is merely a state of the type caused by the attack of a fungus. I brought some of the variety into the garden, and the result is well seen in the specimens sent. It appears to have quite got rid of the fungoid invader. *A. pumila*, therefore, as a variety, falls.—W. R. Linton.

Festuca heterophylla Lam. In woods on the Bere Estate between Pangbourn and Bradfield [Berks]. In this situation it has all the appearance of a native species. No introduced plants are near, nor is the place a plantation or near houses. I am making investigations into the history of the woodland and in other directions, but its occurrence here gives it a different status from what the plant previously possessed.—G. Claridge Druce.

SHORT NOTES.

Selinum Carvifolia L. in Nottinghamshire.—The discovery of *Selinum Carvifolia* in Nottinghamshire last summer is of great interest, and was made under the following circumstances. For many years past I have been on the lookout for *Peucedanum palustre* in Notts, especially in the neighbourhood whence it was originally recorded by Thomas Jowett in his *Botanical Calendar for Nottinghamshire*, published in 1826. Jowett's record runs:—"Marsh Milk Parsley (*Selinum palustre*) has been gathered by Messrs. Hurt and Ramsbottom by the side of a small stream between Mansfield Woodhouse and Park Hall." On August 8th last I was walking along the bank of a small stream bounding the west side of a rather damp low-lying meadow, which has the little River Meden for its eastern boundary. This was in the parish of Teversall, near Mansfield, not more than three miles from Jowett's locality for *Peucedanum palustre*. About midway between the two streams, at the lower end of the meadow, a large patch of rushes indicated a piece of ground wetter than the rest, and among the rushes the white flower-heads of an umbelliferous plant attracted my attention. On approaching the spot, and getting a better view of the plant, my first impression was that here, at last, was *Peucedanum*. A close examination, however, revealed the still more surprising fact that the plant before me was not *P. palustre* but *Selinum Carvifolia*. The plants associated with it were: *Juncus obtusiflorus*, which formed the bulk of the vegetation; *J. conglomeratus*, *J. effusus* and *J. lamprocarpus*, *Scirpus compressus* (very common), *Carex distans* (the first certain record for Notts), *C. hirta* and *C. Goodenovii*, *Triglochin palustre*, *Geum rivale*, *Senecio aquaticus*, *Achillea Ptarmica*, *Scabiosa Succisa*, *Lysimachia Nummularia*, and other commoner moisture-loving species. No plant was seen as to whose nativity there could be the slightest doubt. There is no foot-path through the meadow and, with the exception of an old water-mill and accompanying farm buildings some few hundred yards lower down the small stream mentioned above, there are no buildings within sight. Jowett's locality for *Peucedanum palustre* is, as already stated,

about three miles from the *Selinum Carvifolia* station; the "small stream" being a little brook which supplies the artificial lake at Park Hall and subsequently joins the Meden about a mile and a half further down. Is it not possible—indeed probable—that the plant found by Messrs. Hurt and Ramsbottom may have been *Selinum* and not *Peucedanum?* These gentlemen do not appear to have been critical botanists, and it is not difficult to mistake the one plant for the other. If this theory be correct the *Selinum* has been growing in Nottinghamshire for over eighty years at least, which is a strong argument in favour of its nativity. Mr. Arthur Bennett, who has seen my specimens, and to whom I described the locality, writes:—"This is just the place it grows in in Denmark, &c., and the specimens are like wild specimens from the Continent. . . . . The Cambridgeshire specimens are much larger—taller, more gross in all their parts. . . . . To me the Lincoln specimens are very near akin to the Cambridgeshire; both are much more robust in all parts than your specimens. . . . . The plants you name as growing with the *Selinum* are undoubtedly native, and I believe with you the *Selinum* is *there*. . . . I think with you the [1826] record *does* refer to *Selinum*, mistaken for *Peucedanum* which Reichenbach says is often done on the Continent."—J. W. Carr.

Epipactis repens Crantz (p. 31).—In the *Stirpium Austriacum* (fasc. vi. 473, 1769) Crantz made the above combination, which is based on "Epipactis foliis petiolatis, ovato-lanceolatis, floribus tetrapetalis, hirsutis, Haller Spec. 6." As I stated in my paper on *Helleborine* (Journ. Bot. 1908, p. 10) "the original *Epipactis* of Haller was founded on a single species (i.e., *Goodyera*), although it would appear that he subsequently lost grip of its characters, and added to that genus plants he more correctly put in *Helleborine*." Haller's genus was pre-Linnean, and it may be held that Boehmer, by reviving the name in 1760, makes *Epipactis* the valid name for the genus we know as *Goodyera*. The point I wish to make is that if *Epipactis* [Haller] Boehmer supplants *Goodyera*, the authority for name *E. repens* is, not as is suggested, Eaton, but Crantz.—G. Claridge Druce.

[We concur with Mr. Druce in thinking that *Epipactis repens* must be quoted as of Crantz. *Epipactis* Boehmer (1760) was already in existence when Crantz (1769) constructed his *Epipactis*, although the latter does not seem to have been aware that the name had been employed since Haller. The fact that Crantz included under the name a number of other plants does not invalidate his application of the Linnæan trivial to Boehmer's plant, which had previously, as noted on p. 31, been without a binomial. In a future edition of the *List of British New Plants* the name will stand:

Epipactis Boehmer in Ludwig Defin. Gen. Pl. [ed. 3], p. 337 (1760).

repens Crantz Stirp. Austr. ed. alt. fasc. vi. 473 (1769).—Ed. Journ. Bot.]

Dorset Plants.—A recent paper on the Flora of Dorsetshire (Journ. Bot. 1908, pp. 384–390) would have been the more welcome if it had been prepared with greater regard to previous records. Of the plant-names which I recognize, some which are distinguished by an asterisk as being new to the county have already appeared in print. The asterisk is prefixed to *Papaver Rhœas* L. var. *Pryorii* Druce, for which three Dorset stations were given in the *Flora of Bournemouth* (1900). It is prefixed to *Valerianella dentata* Poll. var. *mixta* (Dufr.) which was reported from Portland by Mr. J. W. White (Journ. Bot. 1896, 342), and for which there are two other stations on record (Fl. Bournemouth, p. 121; Journ. Bot. 1904, 237). It is prefixed to *Euphrasia curta* Wettstein, which appears for Dorset in *Flora of Bournemouth*, p. 165; and to *E. nemorosa* Pers., published for Dorset in Journ. Bot. 1897, 404. And it is prefixed to *Rumex acutus* L., which stands under this name in the *Flora of Dorset* (ed. 2, 1895) with localities half a score, and in *Fl. Bournemouth*, p. 191, under a synonym, where some of these are quoted and two fresh localities added. Mr. C. W. Dale's "additional localities in District G" (which is Purbeck) are from places near Sherborne, not in G but in E. As to *Carex limosa*, there was a time when the late Mr. J. C. Mansel-Pleydell believed the luxuriant specimens of this species from near Morden Decoy, then the only known station in Dorset, to be *C. irrigua*, and sent out specimens under this name, which I have seen. It was at this period, no doubt, that he supplied H. C. Watson with his Dorset list; hence *C. irrigua*, later known as *C. magellanica*, in Top. Bot. ed. 2.—E. F. Linton.

[It is clear that there is room for greater care in marking plants as "new county records." A correspondent, for example, points out that *Filago spathulata*, recorded on p. 26 as "new to vice-county 14," is given for that county on Watson's own authority in Top. Bot.—Ed. Journ. Bot.]

Poa palustris L. in Gloucestershire.—I found a grass last summer of which I could make little, owing to its immature condition; but Professor Hackel, of Attersee, Ob.-Oest., identifies it with *Poa palustris* L. var. *effusa* Aschers. & Graebn. (Syn. Mitteleur. Fl. ii. 1, 418), "with only two-flowered spikelets, which look one-flowered on account of their being too young and undeveloped, the flowers enclosing each other." It occurs by the River Severn some miles above Gloucester, v.-c. 34 (no doubt also on the other bank in v.-c. 33, though I have not yet seen it there) and was gathered on June 15th, 1908. The immediate vicinity of the river has been dug out for some miles between Tewkesbury and Gloucester for brick-clay, and the old brickpits now contain an interesting vegetation. There are no plants there open to suspicion of introduction except willows (e. g., *S. triandra* and *purpurea*), and they are quite likely native. The Gloucester Dock influence is out of the question, I think, though of course *Poa palustris* L. is found among ballast aliens, as in Glamorganshire

Gloucester is some miles down stream from this locality, which is removed from ordinary tidal influence, though the tide comes up the river as far as this and further. The Severn banks are here steep and high. *Juncus compressus*, *Typha latifolia*, *Hydrocharis*, *Carex acutiformis*, *C. acuta* and var. *prolixa*, Potamogetons, and similar plants form the characteristic vegetation of the brickpits. There is great probability of the plant being a true native here. It was in some plenty, growing in several inches of water, when I saw it in June. Further search is necessary to see if it is found in other spots in the neighbourhood. The discovery of fresh localities would establish its nativity.—H. J. Riddelsdell.

The supposed Berberis-Hybrid (Journ. Bot. 1907, 393).—Mr. A. Bruce Jackson tells me that this has been identified at Kew by Mr. Bean as *B. aristata* DC., and agrees well with specimens in the Herbarium. Originally found in Nepaul, it is not uncommon in Kumaon—Chemba Himalaya—at about 6000 to 9000 ft. altitude. He has also kindly sent me fresh terminal pieces of *B. Neuberti* (*aquifolium* × *vulgaris*) from the Gardens; this is a very different thing, and the material before me is spineless. De Candolle's description in the *Prodromus*, i. 106, does not fully fit in with the thorns and fruit of my specimens, but no doubt the determination is correct. But for the frequency of *B. vulgaris* in the neighbourhood, the notion of hybridity would not have occurred to me. I should judge the Bossington shrub more probably bird-sown than planted, from the local conditions; and it must be of considerable age, probably fifty years or more. It may have come from the Acland garden at Allerford, about a mile and a half away.—Edward S. Marshall.

Euphrasia minima (p. 30).—The interesting note of Miss Helen Saunders respecting the discovery of this plant in England caused me to examine a *Euphrasia* I collected in Somerset in August 1898 on the fringe of Exmoor, above Porlock Weir, some four miles from the Devon boundary. Miss Saunders kindly allowed me to see her specimens, and on comparing them with mine I found them identical—a decision which Mr. Bucknall, who knows *E. minima* well abroad, has confirmed. When gathering the plant I was struck by the yellow or yellow and lilac corollas, and thoughts of *minima* flitted through my mind; but the late Mr. Frederick Townsend, to whom I submitted examples, calling attention to the colour, definitely named them *E. nemorosa* H. Mart., and I thought no more about the matter until reading Miss Saunders' note. Mr. Townsend's decision is inexplicable, as *E. minima*, one would think, would appear to a monographer of the genus quite a distinct plant; indeed Coste, who is no "splitter," gives it specific rank and a nice figure (*Fl. France*, iii. p. 44).—C. E. Salmon.

Lycopodium annotinum in Westmorland.—We are glad to put on record that we found this plant—so rare in South Britain—in fair quantity on the side of a mountain gully in Great Langdale in May last, and one of the writers saw it there in good fruit in

September. We think it better to withhold the exact locality, which is, we believe, a new station, but it was in the neighbourhood of where it was first discovered. It was growing on moraine gravel at a comparatively low altitude, its associates besides bracken and grasses being *Lycopodium Selago*, *L. clavatum*, and *Polytrichum commune*. It somewhat resembles the last, when seen at a little distance, and might easily be mistaken for it and thus be overlooked.—J. A. Wheldon and A. Wilson.

REVIEWS.

The New Flora of the Volcanic Island of Krakatau. By A. Ernst, Ph.D.; translated by A. C. Seward, F.R.S. With two sketch-maps and thirteen photographs. Large 8vo cl. pp. 74. Cambridge: The University Press. 1908. Price 4*s*.

In August 1883, as many persons yet at the threshold of middle age will remember, the islands of Krakatau, Verlaten, and Lang, lying in the Straits of Sunda, were the scene of a terrific volcanic explosion, which sunk beneath the sea the northern part of Krakatau, and made great alterations in the contour of Verlaten and Lang Islands. The vegetation of Krakatau having been entirely destroyed by this catastrophe and buried beneath a thick pall of glowing ashes, examination of the flora of the island has afforded, and for years will continue to afford, an excellent test of the value attaching to the speculations of distributional botanists as to the stocking of islands with their vegetable inhabitants. Treub was the pioneer in this work, who, landing in 1886, found the pumice and volcanic ash, as also exposed rocks in ravines of Mount Rakata, already occupied by blue-green algæ (*Schizophyta*), the presence of diatoms and bacteria in association with them being ascertained subsequently. These organisms were doubtless wind-borne; as also were the eleven species of ferns, which gave the pteridophyta preponderance in this the first stage of colonisation. Treub also found a few phanerogams already established. In the drift zone of the beach, seedlings of nine species and fruits and seeds of seven more were seen; while further inland and on the slopes of Rakata the phanerogams numbered eight, of which six—not found on the beach—were Composites and grasses, and evidently transported by wind. The chief result of these investigations was to show how subordinate a part was played in this colonisation by members of the strand-flora, contrary to what happens on coral islands, where colonisation always begins upon the beach.

Ten years elapsed, and then a second expedition visited the islands, the results obtained being published by Penzig in 1902. At this time the flora comprised sixty-two species of vascular plants (fifty phanerogams and twelve cryptogams), besides fruits and seeds of twenty-six phanerogams washed up on the beach, and signs of the characteristic plant-associations or "formations" were evident. On the beach of all three islands the *Pes-caprae*

formation occupied the beach; but there were no mangrove forest plants, and only on Verlaten Island was there any evidence of a strand forest. Further inland was a zone of tall grasses often forming a jungle, and on the hills and ridges grew lowly grasses associated with ferns. Shrubs and trees were rare, especially trees. Penzig estimated that sixty per cent. of this flora had been brought by sea-currents, thirty-two per cent. by winds, and seven per cent. by fruit-eating animals and man.

The author accompanied a party of naturalists to Krakatau in 1906. Every opportunity was taken of the favourable circumstances that offered: these permitted a preliminary study of the flora of some neighbouring islands, as well as short visits to near points, as Sumatra and Java. On Krakatau the party found a state of things considerably in advance of that which Penzig had described. On the beach just beyond tidal limits was a well-defined drift-zone of the usual type, with fruits of *Cerbera Odollam*, *Nipa fruticans*, *Calophyllum inophyllum*, and *Barringtonia speciosa*; fruits and inflorescences of screw pines and seeds of *Carapa obovata*, *Cycas*, and others adapted to transport by oceanic currents. Within this drift-zone was the *Pes-capræ* formation, prominent in this being the runners of *Spinifex squarrosus*, trailing shoots of *Ipomœa Pes-capræ*, and several widely distributed *Leguminosæ* (*Vigna lutea* and *luteola*, *Canavalia obtusifolia*), with here and there tall grasses and sedges associated with such plants as *Euphorbia Atoto*, *Hibiscus tiliaceus*, *Scævola Kœnigii*, and abundance of *Cassytha filiformis*. Beyond this was a young strand-forest (*Barringtonia* formation), consisting of Casuarinas supporting climbing plants (*Vigna*, *Canavalia*, *Cæsalpinia Bonducella*, *Vitis trifolia*), and other plants of wide distribution, including a few specimens of *Barringtonia*, cocoa-nut palms, *Pandanus* and *Ficus* (*fulva* and *fistulosa*) in one or other of the places visited. Still further inland the forest gave way to an association of ferns and tall grasses with Composites and terrestrial orchids (*Arundina speciosa*, *Spathoglottis plicata*, *Cymbidium Finlaysonianum*) scattered among them, the shrubby element being represented by *Tournefortia argentea* and *Scævola Kœnigii* supporting *Vigna*, *Canavalia* and *Cassytha*, while on the banks of streams were blue-green algæ, mosses, and delicate ferns. The upland flora is, however, at present unknown, as the party found it impossible to reach the higher ravines and the peak of Rakata itself.

The flora of Krakatau now includes representatives of all divisions of the vegetable kingdom. The total number of species collected upon the three islands up to date is one hundred and thirty-seven; of these ninety-two (sixty-seven per cent.) are phanerogams, sixteen (eleven per cent.) pteridophyta, three (two per cent.) mosses, three fungi, twenty-two (sixteen per cent.) zygophyta and schizophyta and the myxomycete *Physarum cinereum*.

Special sections are devoted to the direction of the winds and of the currents in the Straits of Sunda, as also to the composition of the soil—a matter obviously of great importance to the nutrition

of the new colonists; also the various means by which these have arrived are exhaustively discussed. The final result is that of the phanerogams thirty-nine per cent. have certainly been brought by oceanic currents, and seventy-two per cent. may owe their presence to this agency as one factor; that birds are responsible for nineteen per cent., and currents of air for thirty per cent.

The letterpress is excellent, and the photographs enable one vividly to realize the various points treated. Professor Seward and the authorities of the Cambridge University Press are heartily to be congratulated on the production of this fascinating little book.

S. M.

Die Gestalts und Lageveränderung der Pflanzen-Chromatophoren. Mit einer Beilage: Die Lightbrechung der lebenden Pflanzenzelle. By Dr. Gustav Senn. With 83 text-figures and 9 tables. Leipzig: Engelmann. 1908.

This volume of 397 pages deals in most comprehensive fashion with the changes of form and position which the chromatophores (chloroplasts) undergo in the living plant. The work is a record of the very thoroughgoing re-investigations conducted by Dr. Senn into the problems of chromatophore-movement. In addition to admirable historical summaries, Dr. Senn provides a large body of new facts and observations bearing on these problems.

With respect to change of form, the author shows that light exercises an important influence, and reaches the conclusions that the chromatophores are only extended in light of mid-intensities; that with higher or lower intensities contraction occurs, and that the blue-violet are the effective rays. Other agents, such as heat and water-supply, also modify the form of the chloroplasts; the general conclusion being that the normal chloroplast is in a state of "tone," which tonic condition is modified by external and internal stimuli. The changes of form, he concludes, are due to the activity of the colourless stroma of the chloroplast itself.

With respect to the changes in position of the chloroplasts—a subject which the elegant studies of Stahl have done so much to illuminate—Dr. Senn presents many new observations. He classifies the chromatophores of plants into seven types, *viz.*, the Mesocarpus, Vaucheria, Chromalina, Eremosphora, Funaria, Ground-tissue, and Palisade-parenchya types; and then proceeds to describe the characteristic behaviour with respect to light and other conditions of these several types.

He concludes from his investigations of Mesocarpus that the chloroplast in this type of plant is balanced as to position by its two-fold reaction: in mid-light it is the red rays which maintain the axial plate-like chromatophore in its "full-face" position, *viz.*, in a plane at right-angles to the incident light; in high-light intensity it is the reaction of the chromatophore to the blue rays which swings it through an angle of 90° till the chloroplast reaches the profile position. In his experiments with Vaucheria, Dr. Senn shows that the reaction of the numerous small chromatophores to light—resulting in their accumulation in the optimally illuminated

part of the cænocyte—is a true phototactic movement called forth by the blue-violet rays.

It would be necessary to extend this notice unduly if reference were made to all the subjects treated of in this volume. The interesting question as to the origin of the chloroplasts—extrinsic or intrinsic with respect to the plant which they inhabit—is considered, though with due caution, and the parasitic-algal theory dismissed as improbable.

In concluding this notice, attention may be directed to the excellent and numerous figures with which the book is illustrated.

FREDERICK KEEBLE.

Die Mneme, als erhaltendes Prinzip im Wechsel des organischen Geschehens. By RICHARD SEMON. Second, corrected edition. Large 8vo, pp. xv. 391. Leipzig: Engelmann. 1908. Price 9 marks.

THIS is the second edition of a work published about three years ago, which did not come under our notice. A severely philosophical discussion of the phenomena of "mnemic homophony" is rather caviare to the plain botanist. His attention is riveted at the outset by the singular title; and it is only by sundry dips into various parts of the book that he discovers that the above title is somewhat of a misnomer, as the work is really an inquiry into some of the remoter effects of stimulation. Even for scientific German it is rather difficult to read, as the author is inspired neither by the lucid style of exposition of Emmanuel Kant, nor by the literary grace of Schlegel. The only section which directly concerns botanists is that which discusses Prof. de Vries's Mutation Theory and his experimental observations on species of *Œnothera*, and a brief reference to Mendel's researches in hybridity.

A brand-new eruption of terminology and involved idiom render the exposition of "chronogenous ecphory" and its correlation with "inherited engramm" somewhat difficult to follow. When these things do happen to pull together all right, and nothing gets out of its place, the net result seems to be that—the mother hen pecks at its food instead of eating it gracefully. The author, who seems a competent observer, battles through his array of premises and conclusions with a heavy artillery of logical reasoning that is remorselessly Teutonic. Scattered through the volume are interesting and suggestive remarks, which would provide a fruitful field for discussion. The text on which the treatise is based seems to be that every stimulus applied to organic matter produces not only its own reaction but also an altered condition or modification of the matter itself. A recent work by Dr. D. F. Harris, *The Functional Inertia of Living Matter*, seems to traverse part of the same ground. There are, however, certain English writers, both in the school of practical Bionomics, and in the field of bio-physical philosophy, who have amplified Herr Semon's text in plainer language.

FREDERIC N. WILLIAMS.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on December 17th, 1908, Mr. W. C. Worsdell exhibited living specimens of various forms of *Selaginella*, and remarked that in *Selaginella inequalifolia* Spring, *S. Willdenovii* Baker, *S. canaliculata* Baker, *S. repens* Spring, *S. Mettenii* A. Br. he observed rhizophores which had grown out spontaneously into leafy shoots. The mode in which this takes place shows that the rhizophore has the morphological character of a shoot, as there is clearly but a single organ here concerned, and there is no question of the shoot developing out of an organ of a different nature represented by the extreme base of the whole structure. The exogenous origin of the normal rhizophores, the fact that the two (upper and lower) at the base of each dichotomy of the stem form therewith a tetrachotomy, two arms of which are in a plane at right angles to the other two, and their constant, definite place of origin, are all in favour of their shoot-nature. Transitions occur between the normal rhizophore and the extreme leafy form. The rhizophore is probably homologous with the "protocorm" of *Lycopodium* and *Phylloglossum*, and with the organ known as *Stigmaria*; if so, it follows that both the "protocorm" and *Stigmaria* are also of shoot-nature. It is very unlikely that organs intermediate between shoot and root can exist in nature.

At the same meeting Mr. George Massee exhibited preserved specimens and lantern-slides of the "Black Scab" of potatoes. During the past few years this disease, caused by a parasitic fungus, has assumed the proportions of an epidemic in various parts of this country. The tuber is the part most frequently attacked, but very young leaves are sometimes infected. In tubers the young "sprouts" are attacked, and owing to the stimulation induced by the parasite the infected sprouts rapidly increase in size and form large coralloid masses or warts, which frequently cover the greater portion of the surface of the tuber. These masses eventually become blackish brown in colour, due to the presence of myriads of dark-coloured resting-spores. Infection always takes place from without, consequently the epidermal or peripheral cells alone are infected. The presence of mature resting-spores imbedded deeply in the tissue of the host at first sight appears to contradict this statement, but this appearance is due to the rapid growth and division of uninfected epidermal cells, which soon forms a tissue superposed on what was previously the periphery. A point of interest in connection with this disease is the absence of peridermal, which in other diseases of potato tubers is so readily formed. On germination the inner, thin hyaline wall is extruded in the form of a sphere, through a crack in the thick coloured outer wall of the resting-spore. The thin wall of the extruded inner membrane soon deliquesces, and liberates myriads of elliptical one-ciliate zoospores. The facts that the host is infected through the epidermal or peripheral cells and the extrusion of the inner wall of the resting-spore as a sphere, from which the zoospores escape in an active condition, indicate that the parasite belongs to the old and well-known genus *Synchytrum*. What happens to the zoospores after

their liberation into the ground remains to be discovered, but experiments conducted at Kew prove that soil once infected produced a diseased crop even after a period of five years.

At the same meeting was read a paper on *Valeriana dioica* by Mr. R. P. Gregory. The author stated that in 1877 Hermann Müller described four forms of *Valeriana dioica*, distinguished from one another by the size of the flower and by the relative development of the male and female reproductive organs. The phenomenon appears to be very similar to that which was described by Darwin in *Rhamnus catharticus*. It has been found that the individuals of *Valeriana dioica* may be conveniently arranged in four groups which are distinguished as, respectively, "female," "hermaphrodite," "long-styled male," and "short-styled male." But while the central types of each group are readily distinguishable, it must be distinctly recognized that they are connected by a series of intermediate forms, and that there is no discontinuity between successive groups. The precise structure of the flowers of each plant varies considerably as regards the relative development of the reproductive organs, with the age of the flower examined. But in addition to this there is in some cases a very wide range of variation in this respect, quite independent of the age of the flower. The experimental work of breeding together the various forms has met with little success.

The well-informed and interesting *Studies in Gardening* which appeared in 1907–8 in *The Times* have been reprinted in a neat and cheap volume ('Times' Office, 1s. net, cloth, pp. 176). It is not a manual of gardening, but the varied and interesting information which it contains renders it a pleasant supplement to more strictly professional works, and the author, who chooses to remain anonymous, is in keen sympathy with his subject. Even those whose gardening library is fairly extensive will do well to add to it this unpretentious but useful book.

A *Handbook of Trees and Shrubs*, to quote the title-page—on the cover the book is styled *The Planters' Handbook*—is remarkable at once for the excellence of the rough vigorous outline drawings and for the extraordinary number of misprints which appear in its pages. For the former we are indebted to (Miss?) Frances Bunyard; for the text, which includes the latter, to Mr. George Bunyard, who, the title-page informs us, has been "for fifty years Principal of the Royal Nurseries, Maidstone," where the book (price 3*s.* 6*d.* net) is published. There is a great deal of information in the volume, addressed to planters and others, and the table of contents and the two indexes (where one would suffice) of English and Latin names render the contents easy of consultation. But why did not the author get some one to revise his proofs? On the page at which we first opened (p. 123) we found "Aitchi*n*sonii," "flor*a*bunda," "cal*l*ycinum"; on the next (p. 113) "Chois*i*a," "Eucr*e*yphia," "Carmichele"; even on the plates the names are mispelled—"Euonym*o*us" and "Liquidamb*er*" face each other on pp. 136, 137. It is a pity that the book should be thus disfigured, as the illustrations are unusually good.

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WAYFARING NOTES IN RHODESIA.

By R. F. Rand, M.D., F.L.S.

The writer returned to Rhodesia in September, 1908, and has thought the following notes in regard to the life-history of various plants growing in the immediate neighbourhood of Salisbury might be of interest to the readers of the *Journal of Botany*.

Trichodesma physaloides A. DC. Usually only one of the four ovarian loculi develops. It grows up over the three abortive ones, as a convex shield or carapace, until the persistent withered style, which affords a good index of the encroachment, comes to occupy a position quite at the edge of the receptacle. The slightly-keeled surface of the nutlet is hairy, with hairs of longer growth fringing the margin. When ripe, it is readily separable from its seat and has the shape of a meniscus. In rare instances two loculi develop, in which case their growth is symmetrical, the two shields meeting to form a ridge in the middle line. When the fruit is fully ripe the calycine segments, which have enclosed it as in a bladder during the ripening, fall back into a horizontal position and end their career as dry and papery wings for the distribution of the fruit. The separation from the parent-plant is unusual. It is brought about by the drying-up and death of the peduncle, a process which frequently extends some distance down the floral axis. Vegetative growth receives renewed impulse after the fruit has fallen, and the leaves gain considerably in thickness and firmness of texture as the season advances. The roots of this plant are said to form a good cleansing dressing in the treatment of poisoned wounds.

Combretum Oatesii Rolfe. Protogyny is pronounced, the style being widely exserted before the petals unfold, and the stamens at this time immature. As the brilliant red fruit is upon the point of ripening, a bleaching sets in which reduces the colour to a featureless dun; the colour revives later to the warm brown seen in many other species of *Combretum*. The bleaching is usually centric in origin, passing outwards to the periphery. Here, as in *Trichodesma physaloides*, the leaves gain considerably in firmness with age.

Thunbergia lancifolia T. And. A striking plant in late September and early October, its large, rich, purple flowers finding in the foliage a foil of vivid green. As the fruit ripens the leaves grow sallow, and the plant lapses into the general background of the veld. The peduncles thicken greatly during the maturation of the fruit. When ripe, the halves of the tough and horny capsular beak fly asunder, and this disruption suffices to unseat the whole fruit from the shallow calycine cup, and, at the same time, dislodges the seeds from the two valves of the capsule. In favourable instances one may see more or less of a ring of empty capsular valves at a distance of a yard or two from the parent

plant. The thickened, rigid peduncle doubtless affords the necessary firm jumping-off point.

Cissus spp.* Nos. 1336, 1337, 1338, 1339, 1340, species of *Cissus*, all of erect habit and all growing upon the Salisbury Kopje. This kopje, a botanical treasure-house, is a hill of upturned magnetic shale, its surface strewn with irregular blocks of the parent rock, these often showing great contortion. This rock closely resembles the magnetic shales of the Witwatersrand; its degradation gives rise to a highly chalybeate soil which is favourable to the vines here considered. They have certain features in common. Protandry is marked in all, the stamens shrivelling up and falling soon after the flower opens. Sometimes they loosely entwine around the style, like the strands of a rope, and so fall together. The four glands of the disc are conspicuous features of the flower. They are cupped at their summits, where they secrete brilliant, glistening drops of honey, which, being freely exposed, attract many and varied insect visitors. After fertilization the glands dry up, and the ovary (except in No. 1338) is turned downwards by a bending of the peduncle, in which position the fruit ripens. The remains of the glands are distinctly featured at the base of the ripe fruit, while, at its apex, a short bristle presents the trace of the style.

No. 1336 is not confined to the hill; it grows freely upon the open flats also, often in bushy masses three or four feet in height. The leaves may be sessile or stalked, their segments, normally five, are sometimes three, sometimes four, in number. Beetles of different species are fond of the shelter the broad leaves afford. The ripe fruit is of a deep purple colour; its ripening being in advance of that of the other species.

No. 1337, though loving the shade, also grows upon the open veld, but sparsely. It is a graceful plant. The halves of its leaf-segments are sensitive to weather changes, and are usually seen folded together.

Nos. 1338, 1339, and 1340 were only found beneath the shade of the trees in which the kopje abounds. No. 1338 has beauty, and is peculiar in that the fruit ripens in the upright position. The leaf has seven segments.

No. 1339 is covered, both as to its leaves and fruit, with fine glandular hairs. The leaf is sessile and has three segments.

No. 1340 has normally five leaf segments.

---

* [n. 1337. *Cissus jatrophoides* Planch. Agrees with specimens in Herb. Kew. collected by L. Scott between Blantyre and Matope, by Thomson between Nyasa and Tanganyika, by Baines in the South African Gold Field, and by Kirk at Mombane. — n. 1336 is allied to the above, but is without flowers.— n. 1338. *C. hypargyrea* Gilg. — nn. 1339 and 1340. *C. crotalarioides* Planch. This species seems to have a very wide range; the specimens from Nyasaland and Rhodesia have somewhat broader and more tomentose leaves than specimens from Djurland. It agrees with the following from Nyasaland: *Buchanan*, n. 282 (1881), nn. 587 and 748 (1891).—I have not seen a diagnosis of *C. rhodesiæ* Gilg mentioned by Engler in Sitz. K. Preuss. Akad. der Wissenschaft. lii. 25 (1906).—E. G. B.]

No. 1362.* This vine grows upon the Salisbury Kopje, but a more favourable site for it is among the granite boulders two miles south-east of the town. There it scrambles over the rocks in great luxuriance. This species appears to secrete no honey, the glands being reduced to scales. The bright yellow pollen is conspicuous against the dark Burgundy-red colour of the flowers, which are crowded into close glomerular bunches. After fertilization the axis of inflorescence and its branches lengthen and increase greatly in thickness. The berry is quite grape-like in appearance, not ovoid and pointed as in the erect species noted above.

Local Note.—A crowded inflorescence is often followed by a cluster of berries or by a wind-distributed fruit. An inflorescence consisting of a single flower or of a form in which the flowers are well spaced out is apt to have its members followed by a capsule or by a berry. In watching the ripening of certain indigenous fruits, as to whose identity one may be in doubt, it is not always easy to forecast whether the ultimate result will be a capsule or a berry. It is largely a matter of drying. The flower has its own conditions to comply with; the fruit, with efficient dispersal of its contained seed as master-impulse, may have to meet a different set of conditions altogether. The requirements of flower and fruit have to be reconciled in the type of inflorescence availed of. Sometimes, as in the above example, the different conditions are met by a growth of the axis of inflorescence after fertilization. Where flower and fruit are anemophilous, as in many grasses, conditions are at their simplest. An entomophilous flower followed by a capsular or by a zoophilous fruit requires a nice adjustment in the type of inflorescence which is to serve for both.

As regards the dry type of fruit, as seen in the capsule and its kind, and the fleshy type, as seen in the berry, a notable point of difference lies in the fact that the capsule is a protective casket for seeds which have an individuality of their own, and which, upon their escape, may pass to further adventure, as thereto equipped; whereas, in the berry the contained seeds are involved in the fortunes as well as in the substance of their fleshy envelope. For them there are no independent excursions. The fate of the berry is theirs, and, doubtless, comes best in the shape of a bird.

Triumfetta Welwitschii Masters. No. 1341. Fruit only. At first sight this appears to be a burr-fruit, but the hairs are not hooked and it does not cling. It is doubtless wind-distributed, as the fluff-like balls roll readily before the wind.

Note.—It would seem useful, for purposes of brief description, to extend the term *anemophilous* to such fruits as depend upon the wind for their distribution, while the term *zoophilous* would define such as lean upon animal agency for their dispersal. Zoophilous fruits might be subdivided into *episomatic* and *endosomatic* groups by way of denoting whether the surface of the body or the

* [*Ampelocissus obtusata* Planch., new to Rhodesia.—E. G. B.]

internal economy were the parts concerned in carriage. Zoophily in a fruit implies specialization, and must be regarded as an advance upon anemophily. The anemophilous fruit has comparatively simple conditions to comply with, *viz.* the meteorological. The zoophilous fruit appealing, as it largely does, to a constituency of birds and mammals, must adapt itself to the local fauna, even as the entomophilous flower adapts itself to the insect fauna. As with flowers, so with fruit, in certain cases the appeal may be to a restricted few. In Africa, as elsewhere, one so often sees the plant, as a whole, wearing a particular aspect when appealing to its insect constituency; and, again, a widely different one when, in time of fruit, if zoophilous, it makes appeal to its mammalian or avian one. It is mainly a question of avoirdupois: the fruit calls for more powerful porters than the pollen. The porters of fruit are often timorous, and value the concealment a rich leafage affords. Berries and drupes appeal largely to birds, and hence one usually sees the parent-plant of such well girt with foliage, be the fruit itself as conspicuous as it may. An overhanging tree may in this regard be an added advantage to the plant it shelters.

ANONA SENEGALENSIS Pers. No. 1342.* Flowers and fruit. This species is very abundant upon the Salisbury veld. Beneath the fruit is a dark encircling band marking the site previously occupied by the stamens. The fresh leaves, when crushed, have the odour of liquorice-root—this appears to be a generic character.

WORMSKIOLDIA LONGEPEDUNCULATA Mast. Is very abundant. It affords a good example of the heterostyly which prevails in its order. Plant individuals carrying long-styled flowers and those carrying short-styled ones appear to be equally common. The flowers, of purest red colour, are visited by butterflies.

BAUHINIA FASSOGLENSIS Kotschy. Nos. 1343, long-styled, and 1344, short-styled. The specimens afford examples of long-styled and short-styled forms, with their complement of long-stamened and short-stamened members, the stamens involved being the fertile ones only. This species abounds upon the Salisbury township lands and commonage, and seems interesting enough to merit detailed notice. Its simple leaves, deeply bilobed, are very sensitive to weather changes. The halves fold closely together during the heat of a dry day, but relax as the day becomes cooler. Atmospheric humidity is probably the most powerful stimulus the leaf receives, the lobes opening out widely in rainy weather. The flowers are mostly set at a small angle with the horizon. They are resupinate, the vexillary petal occupying the front of the

---

* [A form differing from the type in having narrower and more densely tomentose leaves. In this respect it agrees with specimens in Herb. Kew. collected by Dr. Holub in the Leshumo Valley and by C. E. Allen (n. 240) at the Victoria Falls. Engler mentions a "var. *rhodesiaca* Engl. et Diels" in his "Pflanzenformationen von Transvaal und Rhodesia" (Sitz. K. Preuss. Akad. der Wissenschaft. lii. 890 (1906)); I have seen no diagnosis of this.—E. G. B.]

flower. The references to position in the following notes are as though resupination had not occurred.

The vexillary petal, innermost in the bud, is the smallest and the most modified. It is set at a somewhat higher level than the others. All ten stamens are represented, but only two are fertile. The flower has but one plane of symmetry, the median. In the middle line there lie the anterior sepal, the vexillary petal, the anterior and posterior barren stamens, and the gynæceum. The other eight staminal elements are paired, the anterior pair being the fertile ones. The fertile anthers are very large, the four loculi of each anther being in the same plane. In the bud the two anthers lie face to face like a pair of military hair-brushes. In the expanded flower they swing outwards and face posteriorly. The pollen is very abundant, viscid, and somewhat oily. Quite commonly one finds it glueing the two anthers together. In the short-styled plant individuals these stamens have long, stout filaments which arch over the pistil posteriorly, forming a canopy. In the long-styled forms the filaments are short, and the pistil in its turn arches over them.

The second pair of stamens, proceeding backwards, are barren, but their empty anthers are larger and longer than those of the other infertile ones. The filaments are short and cylindrical. The third pair have filaments broadened out into a lanceolate lamina. They are tipped by triangular barren anthers, as finials. The last pair have filaments broadened in the upper part and capped as in the last pair, but below they bend abruptly backwards, and then again bend downwards to their insertion. With the single exception of the anterior stamen all the filaments carry a brush of purple hairs at their bases and confined to the inner face, so forming an almost continuous fringe around the edge of the receptacular cup.

The vexillary petal is abruptly kneed near its insertion and deeply channelled upon its upper surface, this channel forming the path to the receptacular cup. In the channel, and occupying the middle line, is the posterior stamen, capped by a triangular barren anther. Its filament is sharply bent below, the curve following that of the vexillary petal. The anterior stamen, carrying a deltoidal barren anther, has a broad, spathulate filament. It is shut out from the cup of the receptacle by the gynæceum, and carries no brush.

The receptacular cup is well defined. Its walls are dry, smooth, and glistening. A cushion-like prominence occupies part of the floor. This cushion leans towards the pistil, a feature which is accentuated in the long-styled forms, where it is prolonged into a tongue which abuts against the ovarian-stalk. Petals and stamens spring from the edge of the cup, where, upon falling, they leave well-defined scars. The stalk of the ovary springs from the anterior wall.

Note.—The pollen-grains are mixed up with so much food-material that they alone may well constitute sufficient attraction to insects. It is, however, noteworthy that upon cutting into the

walls of the cup a sweet fluid exudes, and this may possibly represent a hidden store for such armed insects as possess the sagacity to tap it. In old flowers the cup is frequently to be seen scarred.

ADENIA SENENSIS Engl. Nos. 1345, ♂; 1346, ♀. Male and female flowers. A dicœcious climber with petaloid, tubular calyx.

No. 1345, male flower. The five filaments are united, forming a central column. They separate above to carry the anthers, which are incurved, touching at their tips. A small cage-like space is thus enclosed. After dehiscence the anthers appear blade-like, being flattened from side to side. They show a tendency to spiral twisting. At the bottom of the floral tube five buttress-like partitions pass out from the column to the wall of the tube, and from the outer walls of the interlying pits five short staminodia spring. The five petals are spathulate, thin, and filmy, and are entirely within the perianth-tube. There is no sign of a rudimentary gynæceum.

No. 1346, female flower. The calyx is as in the male flower. The petals are narrower, here they are mere strips. There are five rudimentary stamens, whose filaments form a tube surrounding the gynophore; their free anther-less portions surrounding the ovary-like tentacles. The staminodia of the male flower are here represented by five small flattened scales. The ovary is stipitate. The styles, three, very short, each surmounted by a peltate stigma whose edges are everted. The whole convex, upper surface of the stigma is beset with short glandular hairs. The perianth persists around the stalk of the fruit, which is a leathery, three-valved capsule, about the size of a small hen's egg. Each of the many seeds is enveloped in a loosely-fitting, soft, membranous bag. Although the plant is a climber, all the fruits hitherto found were borne upon branches which trailed upon the ground.

TRYPHOSTEMMA APETALUM Bak. fil. var. SERRATUM Bak. fil. Fruits, No. 1347. The three valves of the capsule probably fly asunder explosively from tip to base, slinging the seeds forth; one frequently sees the empty, widely-expanded valves still attached to the plant. Each valve carries one seed, and as the seed has its attachment near to the distal pole of the capsule, its position is near the end of the long arm of the lever. The funicle is fragile and easily snaps, and may possibly break before disruption of the capsule occurs.

Note.—The numbers refer to the specimens sent herewith to the National Herbarium. I would again express my best thanks to the staff of the Herbarium and to Mr. Spencer Moore for the help and encouragement they have at all times given me.

[The determinations in this portion of the paper have been made by Mr. E. G. Baker, who has added some footnotes to which his initials are attached.]

Salisbury, Rhodesia, Nov. 29th, 1908.

(To be continued.)

SALVIA HORMINOIDES Pourret.

In this Journal for 1908, pp. 97–106, 141–151, Mr. Pugsley, in a lengthy and interesting paper, gives the history and definitions of *Salvia Verbenaca*, and the plants which have been grouped in that aggregate species. With two of his conclusions I cannot entirely concur, and I should like British botanists, before forming a definite opinion, to consult the excellent materials in the National Herbarium. I speak in no dogmatic spirit; and it may be that what I consider points in varietal or specific distinction may not appeal to other workers.

In the genus *Salvia* the size, shape, and colour of flower have been used by some botanists as decisive points; others have considered leaf-characters, and still others choose the calyx as a salient feature. In a polymorphic species such as *S. Verbenaca*, with its dimorphic flowers, the matter is made very difficult, and it is with those difficulties in mind that I venture to make the following remarks.

The first of Mr. Pugsley's determinations is the identification of the prevailing British *Verbenaca* with *S. horminoides* Pourret. There is no doubt that this plant has been much misunderstood by botanists, probably from trusting to book-characters, as the examples issued by Billot (n. 2178 of his *Exsiccata*).

In critical plant determination from book-characters there are undoubtedly possibilities of varying results, according as one or another character is chosen as the key for separation; but in the case of *S. horminoides* we are on firmer foundation, as a specimen from Pourret is preserved in the National Herbarium. This specimen agrees with his description quoted by Mr. Pugsley from *Mem. Act. Acad. Toulouse*, vol. iii. 327 (1788). But Pourret's specimen differs from our British plant; the leaves, which are longer and narrower than in ours, have their base (except in one case) cuneate, are long-stalked, and of a smoother texture. Our British plants rarely have cuneate leaves; these are shortly stalked, more angularly cut, and of a rougher texture. In a segregate sense the French and British plants appear to me distinct, and our plant, with its very wide range of variation, possesses a distinct facies. Hence, before adopting the name *S. horminoides* Pourret to represent it, I think the specimen referred to should be consulted. I should not put *S. Verbenaca* L. var. *incisa* Benth. (as represented in Brand's specimen from the Salisbury Crags, Edinburgh, whence I have ordinary *S. Verbenaca*) under *S. horminoides* as suggested by Mr. Pugsley, nor do I think the plate of *Gallitrichum anglicum* Jord. & Fourr. (*Icones Fl. Europ.* ii. t. 263, f. 345) represents it.

A plant from Whitchurch, Oxon, approaches Pourret's plant in having some of its leaves cuneate, and the British specimen of *Gallitrichum rubellum* (Jord. & Fourr. t. 265, f. 347) gathered by the late Mr. G. Nicholson at Kew (see Journ. Bot. 1879, 344), which he showed me in the fresh state, also suggest a resemblance to *horminoides*. This in Herb. Brit. Mus. is represented by

a cultivated specimen, and it may be that cultivation reduces the rugose character of the leaves.* At any rate I should have hesitated to identify *rubellum* with *S. Verbenaca* var. *multifida* Visiani as does Briquet (*Labiées des Alpes Maritimes*, p. 514). Therefore I adhere to the use of *S. Verbenaca* L. for our British plant, having in mind that Linnæus in *Hort. Cliff.* locates it "in Anglia."

I am not able to agree with the suggested reference of *Salvia Marquandii* to a restricted *S. Verbenaca* L. In a Benthamian view of species doubtless it might be placed as a variety under that rather than under either of the allied species. But if species, say of the value of *Thymus Chamædrys*, of the Batrachian *Ranunculi*, &c., be taken as a standard, I think this, which Syme treated as distinct, may claim specific rank. I doubt very much its identity with *S. oblongata* Vahl, on which Bentham's *S. Verbenaca* L. var. *oblongifolia* is based. This Mr. Pugsley describes as having "leaves almost simply crenate-serrate, less deeply and irregularly divided than in the type." Bentham (*Labiat.* p. 240), it is true, says "*β oblongifolia* foliis oblongis crenatis vix incisis. *S. oblongata* Vahl! Enum. i. 256," but adds, "in hortis culta," and "est varietas hortensis, foliis angustioribus minus incisis," thus changing Vahl's description of the leaves, which is "profunde serrata vix venosa" (see Vahl, *Enumeratio*, i. 256). Lamarck, (*Illustr.* i. 70), whose *betonicæfolia* is synonymous with Vahl's *oblongata*, too, says the plant is of garden origin. Vahl's description, especially in the leaf-cutting, the size of the flowers, &c., cannot apply to *S. Marquandii*, and I await a specimen of Bentham's variety *oblongifolia* which will match it. Before describing *Marquandii* I carefully compared the Guernsey plant with the beautiful figures in Jordan and Fourreau's *Icones*, fully expecting to meet with it there; but although the plate *Gallitrichum pallidum* described (*l. c.* p. 18) bore a considerable resemblance, I thought, and still consider, the flower is not identical. Briquet (*Labiées*, p. 514) refers this plate to *S. Verbenaca* var. *clandestina*. If, as I suggest, *S. Verbenaca* L. be kept as the aggregate species, I should leave the arrangement as in my *List*, adding "var. *incisa* Benth."

It is true the specimen in the Linnean Herbarium representing *S. Verbenaca* does not resemble our British plant except in the aggregate sense. It agrees in its leaf-texture with the description in *Sp. Pl.* 25, "foliis serratis sinuatis læviusculis, corollis calyce angustioribus," but, as I have said, "læviusculis" does not apply to the ordinary British form. Linnæus gives as a synonym "Salvia foliis pinnatim incisis glabris *Hort. Cliff.* 12"; the diagnosis is in *Hort. Cliff.* followed by the note: "In pratis foliis gaudet magis integris & corolla vix calyce majore cærulea; in cultis vero foliis pinnatim totaliter dissectis, cum corollis paulo majoribus pallidioribus."

G. Claridge Druce.

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* [The cultivated specimen was raised in 1881 from seeds taken from the wild plant in 1879, so that cultivation can hardly have greatly affected it.—Ed. Journ. Bot.]

The Editor having kindly allowed me to peruse the above paper in manuscript, I venture to add the following comments.

In the first place Mr. Druce remarks that in the genus *Salvia* different botanists have used the flower (corolla ?), foliage or calyx as salient features, and quotes *S. Verbenaca* as a plant with dimorphic flowers. It will be observed from my paper that my proposed classification is based, not on any one feature, but on a combination intended to follow as closely as possible the natural affinities of the plants, and that one of the chief points to which attention is drawn is the curious polymorphism of the corolla, accurately described by M. Briquet.

With regard to the identification of the common British *Salvia* with *S. horminoides* Pourret, I may frankly say that when working at the National Herbarium I did not appreciate that the specimen quoted by Mr. Druce was received from Pourret. In its present condition, however, it is not easy to say to what form it really belongs. Its two radical leaves show cuneate bases, and, like those on the stem, are narrower but not, I think, longer stalked than what we may see in Britain. Of its coloration and floral characters nothing can now be said except that the calyx is apparently of the *horminoides* type; and its agreement with Pourret's description is therefore more of a negative than a positive nature. It has somewhat the appearance of a cultivated or shade-grown plant; but it may be normal, and if so it most nearly resembles the form described and figured in Jordan and Fourreau's *Icones* as *Gallitrichum virgatum*. This M. Briquet, relying on the leaf-cutting, refers to true *S. Verbenaca*, but I think, taking into consideration its general features, and especially its corolla, which is coloured like that of the British plant, it is better regarded as a narrow-leaved form of what I understand to be *S. horminoides*. In all of these plants the degree of rugosity of the leaves is, I believe, very largely dependent on exposure, and is generally least in cultivated examples.

This specimen, however, is of little authority alone, for there exists in Allioni's herbarium another, labelled by Pourret himself (referred to in my paper), which M. Briquet identifies with the tall, dark, broad-leaved form such as is found in Britain. As the same view has also been taken in the Abbé Coste's recent *Flore de France* (iii. 102), and seems to accord with Pourret's description, as shown in my paper, I think that, in spite of the foliage of the Banksian specimen, there is very good ground for following the Continental authors in taking up the name of *S. horminoides* for our British plant. There is no reason to suppose that Pourret's conception of *S. Verbenaca* was that which has since prevailed among British botanists, and, as suggested by M. Briquet, he possibly included under his *S. horminoides* all the tall, dark forms, whether with broad or narrow leaves. It may be noticed that I differ from M. Briquet in making the plant with slightly cut foliage my type subspecies, but this is a matter of minor importance. The description and the Banksian specimen both support my view.

The position of the variety *incisa* Benth. and of *Gallitrichum*

anglicum Jord. & Fourr., essentially depends on the determination of *S. horminoides*; and *G. rubellum*, which is ignored in my paper, I have regarded as no more than an introduction at Kew, where I believe two or three plants only were found in 1879. Its affinities are presumably very close to *S. horminiodes* var. *incisa*.

It will be seen that while Mr. Druce considers the British plant distinct, in a segregate sense, from *S. horminoides*, and so rejects this name, adhering to *S. Verbenaca*, yet he admits the Linnean specimens of the latter, and the description in the *Species Plantarum* does not agree with our form except as an aggregate. To demonstrate this, and define the type *Verbenaca*, was one of the first objects of my paper, and upon it depends the determination, not only of *S. horminoides* but of *S. Marquandii*.

I notice that Mr. Druce does not dispute the fallacious nature of the characters whereby *S. Marquandii* was separated from *S. Verbenaca*, both as an aggregate and as a restricted subspecies, but he questions the identity of his plant with *S. oblongata* Vahl. The exact differences, however, are not pointed out, and if my interpretation of the Linnean type of *S. Verbenaca* be accepted, Vahl's description seems to me quite satisfactory, even to the cærulean ("beau bleu") corolla, when due allowance is made for the variation of leaf-cutting which occurs in this as in other forms. For many examples Lamarck's specific name for the same plant—*betonicæfolia*—is also peculiarly apt. It may, I admit, be objected that the foliage of *Gallitrichum pallidum*, as figured, is too sinuate to illustrate the same variety, and might almost have been quoted as a synonym of the subspecific type, but this divergency is no greater than what I have observed among individuals of *S. Marquandii*, and probably generally occurs. I should apply the varietal name in all cases where the normal leaf-cutting was clearly of the crenate-serrate rather than the sinuate-pinnatifid type.

Mr. Druce further thinks that the flower of his plant is not identical with that of *Gallitrichum pallidum*, but again he does not specify the points of distinction which, if any, are, I fancy, attributable solely to polymorphism. It is to be regretted that this important feature escaped the notice of Jordan and Fourreau in all of these plants, and that their otherwise excellent figures show (except in the case of *G. rubellum*) all the corollas of proterandrous form.

In conclusion, if the arrangement in Mr. Druce's *List* is retained, we have *S. Verbenaca* representing a plant which he himself admits only resembles the Linnean type and description in an aggregate sense, while *S. Marquandii*, which has been shown to be nearer to both, stands as a separate species. And, furthermore, under *S. Verbenaca* appear the varieties *anglica* and *incisa*, whose distinctions from the supposed type and from each other have yet to be established.

I cannot help thinking that in the future some more of the intermediate forms of this aggregate species will be more clearly defined, as has been done, not altogether satisfactorily, in the case

of *Euphrasia officinalis*. But as they almost exclusively belong to the South of Europe, and it is impossible to make any progress in this direction without a good knowledge of the living plants, this lies outside the ordinary province of British botanists, who practically have but the one form—varying somewhat, it is true—to deal with. But any further elaboration that may be made will, I expect, be based on the lines laid down by the Abbé Coste and followed in my paper, with the three main species or subspecies, *clandestina*, *Verbenaca*, and *horminoides*.

It has been pointed out by the librarian of the Gray Herbarium at Harvard that, owing to my arrangement of the three varieties, *angustifolia* DC., *oblongifolia* Benth., and *incisa* Benth., under three subspecies, these varietal names should stand as new combinations and not under the original authorities, and must be quoted as such.

H. W. Pugsley.

NOTES ON THE FLORA OF SUSSEX.—III.

By C. E. Salmon, F.L.S.

(Concluded from p. 59.)

Prunella laciniata L. III. Roedean, near Brighton! 1904–8; T. H. Reported in Bot. Exch. Club Rep. for 1906, p. 239 (the locality is there mis-spelt). It varies, in this locality, with yellow, white, and blue flowers, and from a much-divided to an almost entire leaf. From an examination of the stamens from living examples of this species from Somerset, Sussex, and Berkshire, I believe the appendage to be much less bent than as shown in plate 482, Journ. Bot. 1906, 365, whilst that of *P. vulgaris* appears to be only just curved.

**Melittis Melissophyllum* L. IV. Rocks Wood, Uckfield! 1907; Mr. Farr, Jun. A new station for a very interesting Sussex plant, and a record for East Sussex.

Marrubium vulgare L. I. Redford Common; H. G. B. IV. Ramscombe, 1894; H. H. Waste ground, Piltdown Common; D. Downs south of Berwick, 1906.

Stachys palustris × *sylvatica*. I. Cocking! 1907; T. H. III. By Hassocks Railway Station! 1906; T. H.

†*S. annua* L. *V. Potato-patch, Willingdon! 1900; T. H.

Galeopsis angustifolia Ehrh. III. Shoreham Spit, 1902; A. Wallis.

G. speciosa Mill. III. Oat-field, Stanmer Park! 1907; T. H.

G. Tetrahit L. V. Top of Willingdon Hill, 1907; M. C.—Var. *nigrescens* Bréb. *III. Henfield! and Woodmancote! 1906; E. E. and T. H.

Lamium amplexicaule L. I. Bognor; M. C.

†*L. maculatum* L. III. Henfield, garden-hedge once Borrer's; H. H.

**Ajuga Chamæpitys* Schreb. IV. East of Newhaven! 1905; E. E. and T. H. First found here by Mrs. Greatrex. It is new

to Sussex, although known from all the adjoining counties for many years past.

Plantago lanceolata L. var. *Timbali* Reichb. fil. V. Bexhill; W. M. R.—Var. *sphærostachya* Röhl. III. Dyke Hill! 1906; T. H.

*†*Herniaria hirsuta* L. I. Waste ground, Bognor! 1903; M. C.

Chenopodium polyspermum L. *IV. Chelwood Common, 1906; M. C.

C. album L. var. **angustifolium* Druce. I. Bognor! 1904; D. See Rep. Wats. Bot. Exch. Club, 1900–1, p. 25.

C. urbicum L. VII. Waste ground at brickfield, half a mile south of East Grinstead, 1904; C. H. Waddell.

C. rubrum L. I. Near Penfold's Farm, north of Aldwick, 1904. V. Farmyards, Wannock! and waste ground, Polegate! 1907; M. C.

C. Bonus-Henricus L. I. Near Warehead Farm, Halnaker, and Aldingbourne, 1904. II. Storrington; M. C. Near Amberley, 1899. IV. Turner's Hill; D. V. Bo-peep; Nat. Hist. Hastings, Supp. iii., 1897.

Atriplex littoralis L. V. Beyond Marina, St. Leonards, 1886; E. de Crespigny.

A. patula L. var. *erecta* (Huds.). III. Aldrington! 1902; and Saddlescombe! 1906; T. H. V. Bexhill; W. M. R.

A. deltoidea Bab. var. **salina* Bab. III. Aldrington! 1906; T. H.

Suæda maritima Dum. var. *procumbens* Syme. III. Shoreham, 1899; T. H.

Polygonum Convolvulus L. var. *subalatum* V. Hall. I. Bank of River Rother near Stedham! 1907; E. E. and T. H.

P. aviculare L. var. *litorale* (Link). III. In sand, Kingston-by-Sea! 1905; T. H.

**P. minus* × *Persicaria*. III. Henfield Common! 1903; T. H. This had the leaves of *Persicaria* and the spikes of *minus*, and no good fruit was being formed. The Rev. E. F. Linton reported:—"My Wareham plant I found to be big *minus* after all, but this is not *P. minus* pure and simple, and sterility is a good sign in this genus of hybridism; I believe *P. minus* × *Persicaria* is right."

P. maculatum Trim. & Dyer. III. Saddlescombe! 1904; T. H.

P. Bistorta L. I. By the springs below Dale Gate; Cooper. III. Westmeston; E. E.

Rumex pulcher L. I. Boxgrove, 1904. II. North Stoke; D.

R. crispus L. var. **subcordatus* Warren. IV. Lewes; Eng. Bot. ed. 3.

Daphne Laureola L. I. North Berstead; M. C. III. Near the base of Wolstonbury, 1903; H. H. IV. Coombe Place, near Lewes; D.

Viscum album L. IV. Lewes; W. Borrer, Jun., 1805—see Garry in Journ. Bot. Supp. 1903, 90. *VI. On apple at Udimore, 1906; Miss Syer.

Thesium humifusum DC. V. Downs above Willingdon, 1906.

Euphorbia platyphyllos L. VI. Omit the "Fairlight Glen" locality in Arnold's *Flora*. VII. Between Faygate and Bewbush, 1902.

*†*E. coralloides* L. IV. Maresfield Park! 1906; E. H. Farr.

†*E. Cyparissias* L. III. Firmly established on bank by drive, Withdean! 1902; H. H.

E. Paralias L. I. Thorney Island! 1905; W. E. N.

E. Lathyrus L. II. In some plenty in a wood near Ratton Decoy, 1900; D.

Mercurialis perennis L. IV. With male and female flowers on the same plant at Copyhold, Cuckfield! 1904; D. This has been observed before in other places; see Journ. Bot. 1895, 185. —Var. *ovata* (Steud.). III. Hurstpierpoint; Mitten, Bab. Man. ed. 9, p. 370 (1904).

Urtica dioica L. var. **angustifolia* W. & G. IV. Piddinghoe! 1906: T. H. Leaves narrow, not cordate.

Parietaria ramiflora Moench. II. Common about Pulborough, 1899. III. Withdean and Steyning; H. H. VI. Rye, 1895.

Betula verrucosa Ehrh. I. Aldworth, Blackdown, and Linchmere Common; W. M. R. III. Hassocks! 1902; T. H.

B. glutinosa Fr. III. Between Clayton and Hassocks! 1902; T. H. VI. Robertsbridge, 1890; W. M. R. — Var. **pubescens* Ehrh. II. Coppice on Rudgwick plateau; J. W. White. Near canal north of Loxwood, 1903.

Carpinus Betulus L. III. Bramber Castle, one tree, and a tree on road from Burgess Hill to Ditchling Common; H. H. *IV. Common in this district; D. VI. Robertsbridge, 1890; W. M. R. VII. Worth Forest; H. F. Parsons.

Populus tremula L. I. Aldworth, Blackdown; W. M. R.

Juniperus communis L. III. Abundant below Saddlescombe, edge of downs; T. H.

Taxus baccata L. III. Withdean and Wolstonbury; H. H.

Hydrocharis Morsus-ranæ L. III. Henfield; H.H. IV. Ditches near Hamsey Place; D.

Spiranthes spiralis Koch. I. Goodwood Park, plentiful; C. W. Crocker, *in litt.*, to W. B. Hemsley. III. Clayton; H. H. IV. Near Falmer and near road from Malling to Ringmer; H. H. VI. Ore, 1887; R. Paulson.

Cephalanthera grandiflora Gray. III. Withdean; H. H. IV. Coombe Place, near Lewes; D.

Helleborine latifolia Druce var. *media* E. S. Marshall. *III. By path from Wolstonbury Hill to Newtimber! 1901; T. H.

H. longifolia Rendle & Britten. III. Now (1905) lost at Poynings by drainage (see Arnold's *Flora*); Miss M. Robinson. *IV. Between Ardingly and Cuckfield, 1905; W. Girard.

**Orchis hircina* Crantz. See Journ. Bot. 1908, 363.

O. ustulata L. V. Roadside near Littlington, 1906.

O. morio L. I. Near Lavington! 1901; E. S. Marshall. V. Near Beachy Head and Bexhill; W. M. R. VI. Near Robertsbridge, 1890; W. M. R. VII. Worth; H. F. Parsons. Newbridge, Ashdown Forest, 1903.

**O. ericetorum* Linton. IV. Lane End Common, Chailey! 1907; M. C.

Aceras anthropophora Br. III. Wolstonbury, one plant; T. H.

Ophrys apifera Huds. III. Clayton; H. H. — Var. **Trollii* Reichb. fil. IV. Downs near Lewes; Dr. G. G. Hodgson (see Journ. Bot. 1886, 284).

O. muscifera Huds. I. By path from Linch Farm up to the down; H. G. B. III. Frequent about Clayton and Steyning; H. H.

Herminium Monorchis Br. I. Treyford Down, Linch Ball, and Elstead Downs; H. G. B. Near Heyshott Down, 1901. IV. Near the turnpike on the road from Lewes to Ditcheling; Cooper. Downs above Plumpton, 1904; W. E. N.

Habenaria conopsea Benth. IV. Chailey Common! 1907; M. C.

H. viridis Br. III. Piecombe, towards Clayton; H. H. V. Coombe Hill, Jevington, 1906.

H. bifolia Br. IV. Chailey Common! 1907; M. C.

H. virescens Druce. I. Between Whiteway Lodges and Houghton; H. G. B. II. Near canal north of Loxwood, 1903. IV. Near Copyhold, Cuckfield, 1903; D.

Iris fœtidissima L. V. Near Bo-peep; W. M. R.

Narcissus Pseudo-Narcissus L. IV. Near Plumpton Crossways; H. H.

†*N. biflorus* Curt. *IV. Coombe Place, near Lewes; a few clumps in a field known for very many years, but apparently it does not spread; D.

Ruscus aculeatus L. I. West Wittering, 1902. IV. or V. Battle, 1876; J. H. A. J. V. Near Bo-peep; W. M. R. Bexhill, 1877; R. L. Hawkins. VI. Guestling and Pett; E. N. B. About Ore, 1887; R. Paulson.

Polygonatum multiflorum All. I. Golden Hanger; Cooper.

Allium ursinum L. IV. Banks of Ouse and other streams between Cuckfield and Balcombe in several places; Britten. VI. By stream, Stone Stile, Ore, 1887; R. Paulson. VII. Worth; H. F. Parsons. Near Brambletye; D. Near Forest Row Station, 1903; and between Groombridge and Withyham, 1907.

Ornithogalum pyrenaicum L. I. In a meadow on the left-hand of a farm, half-a-mile from the South gate, Chichester; Cooper.

**Colchicum autumnale* L. IV. In one place in turf at Chailey, scattered for a considerable distance and not near a garden or house! 1906–7; T. H. An interesting addition to East Sussex, but it must be remembered that this plant is often seen in nurserymen's lists.

**Paris quadrifolia* L. VI. Several patches in Maplehurst Wood, near Harrow Inn, near Westfield, 1902; Mrs. Evans. New record for East Sussex.

Luzula Forsteri DC. IV. Park Lane, Lindfield, 1904; R. S. Standen. Roadside near Maresfield, 1902.

L. sylvatica Gaud. IV. Fairly plentiful in a wood near Barcombe, 1907; W. E. N. VII. Roadside, Withyham, 1907.

L. multiflora DC. var. *congesta* (Lej.). IV. Heathfield and Mayfield; E. E.

Typha angustifolia L. VI. Ore; Cooper. VII. Furnace Ponds, Holtye Common; H. F. Parsons.

Lemna trisulca L. V. Between Glyne Gap and Bulverhythe! 1907; M. C.

L. gibba L. I. South Berstead; M. C. Bosham, 1903.

L. polyrrhiza L. II. North Stoke; D.

Wolffia arrhiza Wimm. *I. Between Houghton Bridge and Bury, 1902; T. H. A second Sussex station for this remarkable aquatic.

Alisma ranunculoides L. IV. Pondleigh, near Cuckfield; D.

Butomus umbellatus L. VI. Near Rye; Mrs. J. Taylor.

Triglochin palustre L. IV. Seaford; M. C.

Potamogeton trichoides Cham. var. *Trimmeri* Casp. IV. Ditch, Iford, near Lewes! 1897–1900; T. H. (See Journ. Bot. 1899, 136.)

P. pectinatus L. *IV. Seaford; M. C.

P. interruptus Kit. var. **scoparius* Fryer. II. Littlehampton! 1893; T. H. IV. Ditches near Lewes! 1900; T. H. V. Ditch, Pevensey! 1902; T. H.

Ruppia rostellata Koch. V. Ditches beyond Marina, St. Leonards, 1886; E. de Crespigny.

Zostera marina L. var. *stenophylla* A. & G. I. Bosham, 1901.

Scirpus sylvaticus L. VII. Hartfield, 1904; C. H. Waddell.

Carex divisa Huds. V. Between Exceat and Charleston Ponds, 1906.—Var. **chætophylla* Kükenth. IV. Edge of pond by Seaford golf-links! 1905; H. S. Thompson. This was named for Mr. Thompson by the late Mr. C. B. Clarke. In Coste's *Flore de la France*, *C. chætophylla* Steud. is given as a full species, with the following chief points to distinguish it from *C. divisa*:—Glume oval-acuminate (in *divisa* oval-acute or mucronate); fruit oval, attenuated into a rather elongated beak (in *divisa* suborbicular, contracted into a short beak).

C. paniculata × *remota* (= *Bœninghausiana* Weihe). *III. Swampy wood, Henfield! 1905; T. H. IV. The Alders, Cooksbridge! 1905; E. E. and T. H. VI. Hastings; Eng. Bot. ed. 3.

C. vulpina L. var. **nemorosa* (Lumn.). III. Roadside, Edburton! 1906; T. H.

C. divulsa Stokes. I. Midhurst, 1902. IV. Buxted and Maresfield, 1902. VI. About Ore, 1887; R. Paulson.

C. echinata Murr. II. Amberley Wild Brooks, 1899.

C. remota × *vulpina* (= *axillaris* Good.). III. London Road, Clayton, by the seventh milestone! 1907; A. Webster. IV. Plumpton; E. E.

C. Goodenowii Gay. var. **juncella* (Fr.). IV. Wells Green, Kingston, 1906.

C. panicea L. var. *tumidula* Laestad. IV. Wells Green, Kingston, 1906.

C. pendula Huds. I. North Berstead; M. C. II. Near Billingshurst, 1902. III. Cowfold; Cooper. V. St. Leonards; W. M. R.

C. helodes Link. (= *lævigata* Sm.). IV. Sheffield Forest and Chelwood Common! 1906; M. C. The Alders, Beechwood, Lewes! 1907; W. E. N. V. Bexhill; E. N. B.

C. binervis Sm. *IV. Chailey North Common, 1906; M. C.

C. distans L. VI. Hastings; Cooper. Ditch near Winchelsea Station, 1887; R. Paulson.

C. Œderi Retz var. *œdocarpa* And. *VI. Robertsbridge! 1884; R. Paulson.

C. flava L. var. *lepidocarpa* (Tausch.). *IV. Wells Green, Kingston, 1906.

C. acutiformis Ehrh. V. By the stream in Wannock Glen! 1907; W. E. N.

*†*Phalaris paradoxa* L. I. Bognor! 1902; D.

Anthoxanthum odoratum L. var. **pubescens* S. F. Gray. III. Edburton! 1906; T. H.

*†*A. aristatum* Boiss. I. Meadow, Selham! 1907; T. H.

Alopecurus æqualis Sobol. IV. Piltdown! 1906; A. B. C.

A. bulbosus Gouan. III. Lancing, 1905; T. H. V. Bexhill! H. F. Parsons.

Milium effusum L. IV. Near Cuckfield; D.

Agrostis alba L. var. *stolonifera* (L.). VI. Below East Cliff, Hastings, 1886; E. de Crespigny.

Gastridium leudigerum Gaud. VI. Ore; Cooper.

†Apera Spica-venti Beauv. I. Bognor; M. C. IV. Railway-yard, Newhaven! 1904; T. H.

Molinia cærulea Moench. I. Rogate; W. M. R. VI. Westfield Common, 1887; R. Paulson. VII. Tunbridge Wells; M. C.

Glyceria plicata Fr. V. Bexhill; W. M. R.

G. distans Wahlb. V. Frog Firle, Alfriston, 1902.

G. Borreri Bab. *I. Neighbourhood of Selsey, 1829; W. Borrer. (See Journ. Bot. Supp. 1904, 250.)

G. rupestris E. S. Marshall (= *procumbens* Dum.). I. or II. Arundel; Cooper.

Festuca rottboellioides Kunth. V. Beach beyond Marina, St. Leonards, 1886; E. de Crespigny.

F. ambigua Le Gall. *III. Near the sea, Portslade, plentiful! 1905; T. H.

F. ciliata Danth. IV. Waste ground by the railway, Newhaven! 1907; E. E. See Journ. Bot. 1906, 55.

F. elatior L. f. **pseudo-loliacea* Hackel. IV. Plumpton; E. E.

Bromus erectus Huds. IV. Downs near Lewes and at Copyhold, Cuckfield; D.

B. secalinus L. V. Willingdon Green! 1907; M. C. Fine examples, three feet high!—Var. *velutinus* (Schrad.). III. Goldstone Bottom, Hove! 1904; T. H. IV. Cornfield near Sheffield Forest! 1906; A. B. C. Westmeston! D. V. Farmyards, Wannock! 1907; M. C.

B. racemosus L. V. Meadow by Berwick Station! 1904; T. H.

B. hordeaceus L. var. **glabrescens* Gren. III. Shoreham Beach! 1905; T. H. IV. Rottingdean! 1905; T. H. — Var.

**compactus* Breb. III. Aldrington! 1905; T. H. IV. Seaford! 1896; T. H.

†*B. arvensis* L. *III. Saddlescombe Road! 1905; T. H. IV. Cornfield near Lewes Racecourse! 1902; and cultivated land, Blatchington! 1903; T.H.

†*B. squarrosus* L. IV. Cultivated land, Blatchington! 1903; T. H.

*†*B. brachystachys* Hornung. IV. Bank and border of field Rottingdean! 1904; T. H.

*†*B. patulus* M. & K. III. Roedale, Brighton! 1903; E. E. and T. H.

*†*B. unioloides* H. B. & K. III. Aldrington Wharf! 1902, Roedale! 1903, Harrington's Farm! 1903, Whitehawk Bottom! 1904, all near Brighton; T. H.

Brachypodium pinnatum Beauv. V. Downs near Jevington! 1907; M. C.

†*Lolium remotum* Schrank. I. Bognor; Dr. Mateer, Eng. Bot. ed. 3. III. Hurstpierpoint, 1848; W. Mitten (see Journ. Bot. Supp. 1904, 259).

Lepturus filiformis Trin. I. Pagham, 1901. IV. Lewes! 1854; ex herb. Rachel Pryor. V. Between Cuckmere Gap and Exceat Bridge, 1906.

Hordeum nodosum L. III. Shoreham; M. C.

Hymenophyllum tunbridgense Sm. VII. High Rocks, Harrison's and Pen's Rocks, Tunbridge Wells; Cooper.

Asplenium Adiantum-nigrum L. I. Near Fernhurst, 1902; A. J. Crosfield.

A. Trichomanes L. VII. Wall near Birchgrove, Horsted Keynes, 1902; J. E. Clark and H. F. Parsons.

A. Ruta-muraria L. VI. Rye, 1895.

Ceterach officinarum Willd. VI. Wall at Guestling, abundant, E. N. B.

Phyllitis Scolopendrium Newm. IV. In the well at Divalls Farm with var. *multifidum* Moore; J. E. Clark.

Lastrea montana T. Moore. I. Redford Common, 1903; A. J. Crosfield.

Osmunda regalis L. VII. On Harrison's Rocks, Tunbridge Wells; Cooper.

Ophioglossum vulgatum L. I. North Berstead; M. C. III. Clayton; H. H.

Lycopodium Selago L. *IV. On the common not far from Birchgrove School, below Divalls Farm, 1902; J. E. Clark. VII. Holtye Common; H. T. Mennell and H. F. Parsons.

L. clavatum L. *V. or *VI. Fountainhead Field, Heathfield; E. N. B.

Chara vulgaris L. var. *papillata* Wallr. IV. Iford! 1902; T. H.

Nitella flexilis Agardh. *I. Barnett's Mill-pond between Selham and Lavington! 1901; E. S. Marshall.

N. opaca Agardh. III. Pond between the Dyke and Saddlescombe! 1905; T. H.

A NEW HYBRID SAXIFRAGE FROM SCOTLAND.

By Rev. E. S. Marshall, M.A., F.L.S.

Saxifraga nivalis × stellaris (× **S. Crawfordii** mihi), n. hybr. Planta (in exemplis a me visis, junioribus) nana, sub anthesi uncialis-biuncialis. Radix foliis anni prioris emarcidis coronata. Folia ovata vel ovato-lanceolata, crassiuscula, subciliata, pilis albis crispulis superne obsita, subtus glaberrima, speciminum minorum subsessilia, majorum in petiolum limbum æquantem brevioremve sensem angustata, subobtuse dentata; dentium sæpius apex plus minus cartilagineus. Scapus pilis glandulosis pallide rubris densius indutus, admixtis albis nonnullis crispulis eglandulosis, simplex, aut ad basin ramum unicum semiuncialem uniflorum emittens. Flores 1–3, parvi, subglomerati. Sepala erecta glabra ovata subobtusa, superne præsertim frequenter atropurpurea. Petala oblonga obtusa ex ochroleuco albida, ad apicem aliquando rubella, calyce vix duplo longiora. Fructus desunt.

Plant (in the rather young examples seen by me) dwarf, 1 to 2 inches high when in flower. Root crowned by the withered leaves of the previous year. Leaves ovate or ovate-lanceolate, rather thick, subciliate, with scattered white curly hairs above, quite glabrous below, those of the smaller specimens subsessile, those of the larger gradually narrowed into a petiole equalling or shorter than the blade, subobtusely toothed; tip of the teeth usually more or less cartilaginous. Scape clothed rather densely with pale red glandular hairs, mixed with a good many curly white ones, simple, or producing near its base a solitary 1-flowered branch ½ inch long. Flowers 1 to 3, small, mostly clustered. Sepals erect, ovate, subobtuse, frequently dark purple, especially upwards. Petals oblong, obtuse, yellowish-white, sometimes reddish at the tip, hardly twice as long as the calyx. Fruit wanting.

My friend the late F. C. Crawford sent me, about six years ago, half a dozen specimens gathered by him on August 7th, 1902, in Corrie Sneachda, Cairngorm, v.-c. 96 E. Inverness, on granite, with *nivalis* × *stellaris* pencilled in. He added on the label:—"I noticed a big bed of this saxifrage in this diminutive state, owing to the cold summer. If it be a good or interesting plant, I know where to get it, as I must go back to Corrie Sneachda to look for *Carex lagopina*. These specimens are all I took of it." Unfortunately his intention was never carried out, and I now name it after him. Probably the station was above 3000 ft.

I have no doubt about its parentage. The general appearance is that of a small broad-leaved *S. stellaris* with capitate inflorescence, coming nearest to the forma *pauciflora* Engler, *Monographie der Gattung Saxifraga*, p. 133:—"Humilis, 1–2-flora. Folia plerumque latiora, obovato-cuneata, hirsuta. Capsula major. *Hab.*—On the highest Alps and in the far north: as in Norway, Greenland, Labrador, &c." But the characters show clear influence of *S. nivalis*; among these I may specially call attention to the thick

leaves, more strongly toothed (teeth often cartilaginous-tipped), more petiolate in well-developed specimens, quite glabrous beneath; the clothing of the scapes; the small oblong petals, just like those of *nivalis* (in *stellaris* they are linear-oblong, more acute, and *strongly reflexed*); and the compact heads.

A more surprising recent discovery is that of *S. hypnoides* × *tridactylites* (× *S. Farreri* Druce), gathered on Ingleborough, W. Yorks. It is very possible that some of the hypnoid saxifrages formerly described as species may also be hybrids; several species grow together on Brandon Mountain and the Snowdon range, and are quite likely to cross with one another.

A SEVENTEENTH CENTURY ENGLISH BOTANIST.

By James Britten, F.L.S.

In the course of my examination of the Sloane Herbarium, of which the Trustees of the British Museum propose to publish a history, I have come across a collection (H. S. 27) of plants made by a seventeenth century botanist, the Rev. Matthew Dodsworth, sometime rector of Sessay in Yorkshire. Both British and foreign species are represented: several of the numerous specimens, which are very well preserved and carefully named, are localized in Dodsworth's neat and pretty hand, and it may be of interest to publish these early localities.

The title to H. S. 27 implies some doubt as to the collector of the plants it contains: it runs—"A book of dried plants, which belonged to Mr. Pett, and supposed to be gathered by Mr. Johnson, Lawson, or Dodsworth, containing several very scarce English plants. Some gathered by Thomas Willison [Willisel]." The collection, however, as Mr. Carruthers had already noted in the volume, was certainly made by Dodsworth; the labels in his handwriting extend up to f. 199: the remaining plants are unlabelled and may have been added later.

The little that has hitherto appeared in print about Dodsworth will be found in the *Biographical Index of British Botanists*, p. 50. He took the degree of B.A. at Cambridge in 1674 and at Oxford (where he proceeded to M.A. in 1678) in 1675. In 1690 he was rector of Sessay, near Thirśk, in Yorkshire, but the present rector, the Rev. G. R. Dupuis, writes that he can give me no information about them, and the old registers are illegible. As will be seen from the localities to be quoted, he botanized at Oxford and in Cheshire, Derbyshire, &c., as well as in Yorkshire; one plant is from Hampstead Heath. The botanists of his time had a high opinion of his abilities: Ray (Syn. ed. 2, pref.) styles him "botanices apprimè gnarus" and (Hist. 1306) "amicissimus vir reique herbariæ pertissimus." With Plukenet he seems to have been on intimate terms as well as with John Watts, Curator of the Apothecaries' Garden at Chelsea (1680–93) (see letter in Sloane MS. 4062, f. 204, hereinafter printed).

Dodsworth was one of the earliest observers in England of *Scirpus fluitans* and *Eleocharis acicularis*, although hardly their "first discoverer" as Pulteney (*Sketches*, ii. 121) states: of the former Plukenet (Alm. 180) says: "à Reverendo Viro Mattheo Dodsworth, Evangelii prædicatore vigilantissimo & Botanicorum numero nequaquàm postremo, nobis primùm ostenditur"; of the latter (Alm. 201) "Primus ejus inventor in Angliâ nostrâ (post Gillenium) fuit amicissimus & plurimum Reverendus Vir, reique Herbariæ amantissimus, D. Matthæus Dodsworth, qui etiam olim hujus exemplar optime exsiccatum nobis benigne communicavit": the specimen figured by Plukenet (Phytogr. t. 40, fig. 7) is in his herbarium (H. S. 96, fol. 120). He also sent Plukenet *Utricularia minor*: "Reverendus Vir & amicus noster singularis, D. Dodsworth, in agro Eboracensi sponte natum invenit, & jampridem nobis benignè communicavit" (Alm. 251). His most important discovery, however, was *Ribes alpinum*, which he added to the British Flora: its first record is in R. Syn. ed. 2, 298 (1696), "In agro Eboracensi invenit D. Dodsworth," and a specimen from him is in Ray's *Hortus Siccus* (see Journ. Bot. 1870, 82) preserved in the Department of Botany.

Dodsworth was evidently interested in abnormalities, whether in colour or in form, as his collection contains many besides those mentioned below.

The following is a list of the plants which are localized: I have for convenience substituted for the pre-Linnean nomenclature the names generally received. The order is that of the collection.

Adoxa Moschatellina L. "Found in y^{e} banks of lanes betwix Mottram and Wood-head" [Cheshire], f. 76.

Ranunculus Lingua L. "Neare Bottley mills neare Oxford," f. 77.

Trifolium repens L., proliferous form. "I found it in the Orchard on the west end of y^{e} parsonage house at Darfeild accordingly as it is cited by Mr. Stonehouse in Phytolog. Britan." [114], f. 84. Darfield, where Stonehouse was rector, is near Barnsley, Yorkshire.

Anagallis arvensis L. "Pimpernell with an elegant white flower. I found it in a field by South Hinksey 2 miles from Oxford," f. 103.

Limosella aquatica L. "By Binsey in Oxfordshire," f. 103.

Lychnis Flos-cuculi L. "Wild Williams with a whitish stalk & more elegant white flower, a quarter of a mile from Gosford bridge in Oxfordshire," f. 106.

Drosera anglica Huds. "On Knaresbrough Forrest not far from y^{e} Spaw," f. 121.

Narthecium Ossifragum Huds. "In a boggy place about 2 stone's cast from y^{e} sweet spawe in y^{e} Forrest of Knaresborough," f. 121.

Pyrola media Sw. "It grows plentifully by Hallifax," f. 123. Recorded hence by Merret, Ray, etc. f. 123.

Polygonum viviparum L. "Neare Ingleborow-hill," f. 133.

Lamium album L. *β integrifolium* Sond. (see Journ. Bot. 1899,

130; 1903, 150). In addition to the specimens in the Sloane Herbarium cited (ll. cc.), Dodsworth has a specimen (f. 137)—"Lamium parietariis folliis. In the physick garden at Oxford." It may be remembered that there is a specimen in the volume said to be of Banister's plants "probably gathered by him before he went to the West Indies in the Garden of Oxford and in the fields" (H. S. clxviii. f. 188).

Vaccinium Oxycoccos L. "On severall boggs neare unto the house of Mr. Henry Balgay at Rowlee [Rowley] in Darbyshire," f. 138.

Primula veris L. "This Cowslip I gathered in the Garden of Mr. Crafford a baker in Oxford wch had at first six score and odd flowers all fully blowne," f. 141.

Primula . "This Oxelip when first found in Cumner woode, not far from Ensham Ferry in Oxfordshire had betwixt fower score and an hundred flowers fully blowne, besides what were not sprung out," f. 141.

Odontites rubra Gilib. (flore albo). "Cow-wheat with white flowers. In Barwick-field neare unto the Oxeclose," f. 143.

Listera cordata R. Br. "This was brought me by Thos. Willisell who as I remember found it in Yorkshire," f. 144.

Pinguicula lusitanica L. "Pinguicula sivé Sanicula Eboracensis minima flore albo. This was brought me out of Cambridgeshire by Tho Willisel," f. 144. I find no record of this plant for Cambridgeshire; it is correctly named by the pre-Linnean phrase and referred to Ray's Hist. 752, where it is described. Willisel may have mistaken the place whence he brought the plant—it may be remembered that he was employed by Merret during five summers to collect plants "per universam Angliam" (Merr. Pin., Epistola ad Lectorem): anyway, there is the record!

Lonicera Periclymenum L. "Oke-leav'd Woodbind: in the Hedge of a Close belonging to Mr. Nortons ffarme at Chillswell in Berkshire," f. 152.

Montia fontana L. "First observed by Mr. Goodyer and by him called Blinks," f. 165. Goodyer was a correspondent of Dodsworth, and sent him various specimens. Mr. W. R. Clarke (no doubt correctly) cites Ray's Cat. Cantab. App. i. 3 (1663) as the first record of the plant, but it would appear that it was first observed by Goodyer, who gave it its appropriate name, in reference, as Prior says, to "its half-closed little white flowers peering from the axils of the upper leaves, as if afraid of the light." Merrett says: "found by Mr. Goodyer in Hampshire, and by him properly named Blinks" (*Pinax*, 5 (1666)).

Veronica montana L. "Ex Ericeto Hamstediano," f. 170.

Galeopsis speciosa Mill. "In many places of Yorkshire," f. 181.

Sisymbrium Thalianum J. Gay. "On Hamsted heath," f. 187.

Dodsworth also sent plants to Merret, in whose herbarium (H.S. 33, 34) of plants "especially from the Northern parts of Britain" are the following—the only ones with labels in the collection:

Galeopsis dubia Leers. "In a cornfield by Everthorp in Darfield parish, as alsoe in some fields near Wakefield in good plenty" (H.S. 33, f. 80). It will be remembered that it was from this locality that the plant was first recorded as British (R. Cat. 283, 1670).

Neottia Nidus-avis L. C. Rich. "In S^{r} W. Vavasour's woods at Hazlewood [Yorks]." H.S. 34, f. 6.

Ophrys muscifera Huds. "On Garforth cliff" [Yorks]. H. S. 34, f. 7.

Ajuga reptans L., flore carneo. "This I could no waye preserve in its colour." H.S. 34, f. 91.

Prunella vulgaris L., flore albo. "In a narrow lane by . . . . Barwick oxclose" [Yorks]. H.S. 34, after f. 107.

Viola tricolor L. "The leaves of this were finely striped and of a delicate colour when growing, but will not retain it." H.S. 34, after f. 107.

The following are the letters to Plukenet to which reference has been made:—

[SLOANE MS. 4062, f. 196.]

S^{r}

Cowick July 21st 1680.

Least you should either think me guilty of ingratitude, or forgettfull of those ffavours I have received from you, I have made bold to give you the trouble of a few lines. The Catalogue of Plants you requested me to gett I keep still: But has not been so fortunate to meet with so many of them as I assured myselfe, for the rains with us have been so great & continuall, y^{t} tho' it hath been faire above yet so exceeding dirty abroad, especially on the Boggy and Moorish grounds (where I had the most hopes) y^{t} as yet are not passable. However I have mett with thirty of them, & if the weather take upp in any time, I hope I shall find more. All the Indian seeds I told off came up very kindly, & thrive beyond expectation til the great Rains came w^{ch} destroyed most of them, if any of them come to perfection I shall endeavour to preserve them for you, This S^{r} with my kind respects to y^{r} selfe & y^{r} wife, & Mr. Raper is all att this time ffrom y^{r} assured and constant

ffriend and servant

MATTH DODSWORTHE.

S^{r} you would mightily add to y^{r} former ffavours, if you could with convenience preserve me some exoticks w^{ch} opportunity wil not give me leave neither to get nor see.

S^{r} If you please to give me an answer to this you may direct y^{r} letter to me att S^{r} John Dawneys house in Cowick Yorkshire to be left with y^{e} Postm^{n} of Rockliffe.

These
For Dr. Plucknett att his house neare
the old Pallace Yard Westminster
London.

[SLOANE MS. 4062, f. 204.]

Hon^rd S^r Cowick May y^e 23^d 1681.

The last time y^t I had the happienesse of enjoying y^r good company, was att Chelsey w^th Mr. Watts, w^hen Mr. Watts was pleasd to desire y^t I would send him the *Stratiotes sive militaris*, *Aizoides*, *Millefolium*, *Galericulatum palustre minus*, & the *Juncus parvus fontalis admirabilis*. J. B. These, S^r, are to request you, to acquaint Mr. Watts y^t he may have them sent as soon as he pleases if he wil be pleas'd to send me directions how I may direct them to him, & the manner also he himselfe uses in putting such things up, for wanting y^t experience w^ch he has had, I am unwilling to pack them up without his advice. W^th these (if he have them not already) I can send him, *Plantago aquatica minor*, *Plantaginella palustris*, *Erica Baccifera*, *Juncus parvus cum pericarpiis rotundis* J. B. *Juncus parvus montanus cum parvis capitulis luteis* J. B. *Juncus capitulis Equiseti minor*, an *fluitans* C. Bauhini. J. B. [*Eleocharis acicularis*], *Sium minimum* Ray, *Poligonum marinum*, *Vaccinia palustria*, & *Persicaria pusilla repens*. My kind respects, pray, to Mr. Watts & thank him kindly ffor his seeds, & tell him y^t considering what an extraordinary dry season we have had, haveing not raind with us, above this two moneths, his seeds comes up reasonably well, I have 4 of his Arrow Seeds com'd up & looks very wel, so doth his Perua Marvell, & both the Palmæ Xsti & many others. . . . But I shall giue him a more exact account w^hen I shall have the happienesse to see him. S^r If you continue y^r resolution for ffrance this summer I wish you all the happienesse imaginable in y^r travails, & as safe, & good return, My service to Madam Plucknett, & to y^r neighbour Mr. Raper. In hast I subscribe my self, S^r,

y^r most assured constant ffriend & servant
MATTH. DODSWORTH.

What plants, S^r, I meet with y^t are in y^r Catalogue, & such as comes to perfection of those seeds w^ch you mark'd I shall carefully preserve for you.

A note may be added as to ARNOLD GILLEN, to whom Plukenet refers in a passage already quoted (p. 100). Moench (Method. Suppl. 286 (1804)) dedicated the genus *Gillenia* "in memoriam Arnoldi Gillenii Med. Cass., qui hortum 1632, in 4 edidit." He was a correspondent of Caspar Bauhin, who in a note prefixed to his *Prodromus* (1620) mentions him — "Arnoldus Gillenius, Ducis Megapolitani [Mecklenburg] Medicus" — among those "quorum opera in prodromo adiuti fuimus." Gillen sent plants and seeds to C. Bauhin (see Prodr. 13, 70, 84, 113, 147) and brought from England *Scirpus fluitans* L.—"in aquosis Angliæ fluitat, unde D. Gillenius attulit" (Prodr. 23)—for it is to this that Linnæus and Ray (I think correctly) refer the "Juncellus capitulis equiseti fluitans" (which Plukenet cites doubtfully under his "Juncelli omnium minimi capitulis Equiseti" = *Eleocharis acicularis*). Bauhin is thus the first to mention *S. fluitans* as an

English plant, Mr. Clarke's "first record" being that of Ray (1688), and the reference to Gillen is all that we know of his visit to England. Of the book referred to by Moench there were two editions: the entry in Haller (i. 440) runs: "Arnoldi Gillenii *Hortus* Cassel. anno 1627 4°, 1632 4°. Catalogus brevissimus, solorum nominum, absque synonymis aut adnotationibus." Pritzzel (ed. i.) enters his name as "Gille, Arnold, latine Gillenius"; but for this there seems to be no authority. This is all I can find about him.

RICCIA CROZALSII IN BRITAIN.

By D. A. Jones, F.L.S.

During a visit to Barmouth in September, 1908, Mr. S. J. Owen and I found a small *Riccia* growing sparingly on the top of a mud-capped wall in company with *R. glauca*, *R. sorocarpa*, *R. nigrella*, and *R. Lescuriana*. This being the station where *R. Michelii* Raddi var. *ciliaris* Levier (*R. tumida* Lindenb.) had been gathered by Mr. W. H. Pearson in April, 1876, we sent it to Mr. Symers M. Macvicar as that variety. He, however, suspected it to be *R. Crozalsii* Levier, but could not form a definite opinion, as the immature state of the material made it difficult to decide the inflorescence. However, in the following month more mature specimens were gathered at Barmouth and Harlech. These were sent by Mr. Macvicar to M. Crozals, who finally decided that the plant agreed with *R. Crozalsii* in its monoicous inflorescence and vegetative characters. This species was first described and figured by Dr. Levier in 1902 (*Revue Bryologique*, iv. p. 73) from specimens collected by Crozals at Lamoure, between Montpellier and Maugio, in March of the same year.

The following is for the most part a translation of Levier's Latin diagnosis:—Monoicous, slender, 2–3 mm. long, 0·34–0·75 mm. wide, glaucous green except at the margins, and dark-coloured apices, simple or bifid, not stellate. Fronds in linear segments, obtusely elongate-ovate, apices acute and deeply sulcate, canaliculate, margins tumid, fringed with two rows of cilia about 0·34 mm. long, more or less inflected. Ventral scales at the apex of the frond hyaline, small, those along the postical sides dark purple. Transverse section at the apex of the frond almost as broad as high, at the middle semicircular, dorsal surface with two fairly deep channels, middle segment convex, margins ascending almost vertically. Upper layer chlorophyllose, occupying about the third part of the thickness of the frond. Antheridia mostly about the apex, not easily detected; ostioles small, 120–130 μ long, discoloured, projecting out of the middle depression. Sporangia quite numerous on the same frond, often two in the same transverse section. Style very dark, slightly protruding above the epidermis. Spores 65–85 μ, opaque, dark brown, border narrow, entire, or sparingly and minutely granular-papillose. Areolæ numerous, 8–12 along the diameter. Rhizoids hyaline, with very

numerous papillæ within. Epidermal cells not incrassate or mamillate.

In his additional notes Dr. Levier says that at first sight the plant recalls *R. ciliata* Hoffm., which is also a monoicous species and belongs to the ciliate group. It grows in similar habitats, and resembles a small form of the latter with shorter hairs. When single fronds, however, are examined, even with a lens, the resemblance disappears. In *R. Crozalsii* the postical sides are of a purple colour and not green, and the margins much more thickened. A transverse section shows the width and thickness to be almost equal, whereas the proportion in *R. ciliata* is as three is to one. The frond also in the latter species has the same thickness from apex to base, so that the upper and lower sides are parallel. Further, the spores in *R. ciliata* measure from 75–90 μ, and the border is transparent and wider, furnished with more numerous, larger, and generally truncate papillæ.

R. Michelii var. *ciliaris*, which has been found to be identical with *R. tumida* and *R. palmata*, differs in the dioicous inflorescence. It is twice as large, and the margins are more tumid, maintaining the same thickness all along the sides of the frond. In our plant the borders become thinner towards the base. The spores of the former are about 100 μ in diameter.

R. Lescuriana Aust. (*R. glaucescens* Carr.) may be known from *R. Crozalsii* by its larger size, thicker and more swollen edges, and single row of cilia. It is often, however, almost glabrous; in fact, this is the usual form met with in Britain. In section it is two and a half times as broad as high, while the ventral surface is only weakly arched. It differs also in the larger size of its spores, which measure 90–120 μ in diameter. The inflorescence is monoicous. On the drier and more exposed ledges of rocks at Harlech and Morfa Bychan, *R. Lescuriana* grows in small irregular rosettes with a few hairs, scattered about the apices of the fronds. In habit this resembles a less ciliate form of *R. Crozalsii* growing in rosettes and accompanying it. C. Müller, in Rabenhorst's *Krypt. Flor. v. Deutschl.* p. 170 (1907), describes the epidermal cells of *R. Crozalsii* as sometimes mamillate. Levier and Schiffner have not seen this character, nor do our forms appear to show it.

Considerable difficulty is often experienced in finding the antheridia in several species of *Riccia*. This is due to the fact that the ostioles only appear for a short time. They may be easily seen, however, in transverse sections at the apex of the frond of *R. Crozalsii* gathered during the months of November and December.

In his account of the occurrence of *R. Crozalsii* in Italy (*Oesterr. Bot. Zeitschr.* 1905, 294), Prof. Schiffner mentions more than one form. In addition to the type he found a compact state, forming a rosette with fronds twice as large and with less purple-coloured sides. This grew in more shady situations. Another large plant growing in similar habitats and sent by M. Crozals from the South of France deviated somewhat from both of the

above in not forming rosettes and in having long cilia. All these forms occur along the Welsh coast.

This plant has been found in several places in South France and North Italy, and also near Meran in the Austrian Tyrol. It grows on the top of walls, ledges of rocks, and grassy banks facing the sea at Barmouth and Harlech in Merioneth, and at Morfa Bychan in the adjacent county of Carnarvon.

BIBLIOGRAPHICAL NOTES.

XLV.—Dates of Hooker's Flora Boreali-Americana, etc.

A recent inquiry as to the dates of the *Flora Boreali-Americana* suggests that it may be useful to reprint the information given by Mr. B. D. Jackson in *Bull. Herb. Boissier*, 1893, p. 298. The dates of two of Sir Joseph Hooker's works are added from the same source, p. 299.

Flora Boreali-Americana.

"This work came out in parts, but as was usual at that time no official statement was published as to the dates of publication. Consequent upon this, doubts as to the actual publication of many species therein contained have been rife. The following details may help to settle these questions:—

"Vol. I. Part 1, Consisting of six sheets, pp. 1–48, came out in 1829 (*cf.* Linnæa, v. 1830, Litt. 102) [and Loud. Gard. Mag. vi. 85 (Feb. 1830)], and Seringe, Bull. Bot. I. (Mars 1830), 49.

"Parts 2 et 3, pp. 49–144, in 1830 (*cf.* Linnæa, vi. (1831), Litt. 154).

"Parts 4 to 6, end of vol. i. in 1834 (*cf.* Ann. Sc. Nat. sér. ii. tome iii. (1835), 109, 'livr. 3-7')).

"Vol. II. Part 7, in 1834. See last note.

"The following dates are taken from the copy in the Library of the British Museum as those when the respective parts were received by the Principal Librarian, and denoted by stamping:—

"Vol. II. Part 8 pp. 49–96, in July, 1838.
" " 9 " 97–144 (same date).
" " 10 " 145–192, Jan. 1, 1839.
" " 11 " 193–241, Nov. 15, 1839.
" " 12 " 241 to end, July 8, 1840.

Flora Novæ Zealandiæ.

"No. 1 (pp. 1–40), issued June 10, 1852.
" 2 (" 41–80), " Sept. 6, 1852.
" 3 (" 81–120), " Jan. 13, 1853.
" 4 (" 121–160), " Dec. 5, 1853.
" 5 (" 161–200), " April 27, 1854.
" 6 (" 201–240), " July 11, 1854.
" 7 et 8 (" 241–312), " Feb. 9, 1855.

"These dates are taken from manuscript memoranda in the copy in the Library of the Herbarium, Kew.

FLORA TASMANIÆ.

"No.	1	(pp.	1–40),	issued Oct. 24, 1855.
,,	2	(,,	41–80),	,, May 13, 1856.
;,	3	(,,	81–120),	,, Oct. 17, 1856.
,,	4	(,,	121–160),	,, July 28, 1857.
,,	5	(,,	161–200),	,, Dec. 1, 1857.
,,	6	(,,	201–240),	,, May 3, 1858.
,,	7	(,,	241–280),	,, Sept. 3, 1856 [1858].
,,	8	(,,	281–320),	,, Feb. 15, 1859.
,,	9	(,,	321–360),	,, Aug. 16, 1859.
,,	10 et 11	(,,	360–420),	,, Dec. 29, 1859."

NOTES ON *CAREX CANESCENS* LIGHTF.

BY REV. E. S. MARSHALL, M.A., F.L.S.

WITH his approval I venture to contribute some supplementary remarks to the recent paper (Journ. Bot. 1908, 369) by Mr. F. N. Williams; he has also sent me an interesting letter from Mr. Arthur Bennett, of which I have made use.

Var. TENUIS Lang. I have specimens so named by Herr Kükenthal, collected beside the streamlet descending from Corrie Bonhard to Glen Clova, v.-c. 90 Forfar, at 1200 ft.; and a plant gathered in 1886 near Braemar, v.-c. 92 S. Aberdeen, seems referable to this. Mr. Bennett mentions his having seen it at Weybridge, v.-c. 17 Surrey, with twenty-two culms on one root. I also have it from near Tilford, Surrey.

Var. FALLAX Asch. & Graebn. is, I believe, the usual alpine form in Scotland, though plants not unfrequently occur which approach the type. I have gathered it in the following additional stations:— v.-c. 69 Westmorland. High wet moors in Upper Teesdale, ascending from the Mazebeck to High Cup Nick, associated with *C. magellanica* Lam.—v.-c. 88 Mid-Perth. Near Dalnaspidal Station.—v.-c. 89 E. Perth. Meall Odhar.—v.-c. 90 Forfar. Driesh; Corrie of Clova.—v.-c. 97 W. Inverness. Glen Spean Hills.—v.-c. 106 E. Ross. Ben Wyvis. This is, for the most part, the supposed British *alpicola*; Mr. Williams has misunderstood my argument in Journ. Bot. 1898, 75–6, which was against, and not for, the occurrence of true *alpicola*. As var. *fallax* was not published until 1902, Herr Kükenthal can hardly be blamed for not knowing it at that time. He afterwards named various gatherings as var. *dubia* Bailey; but I understand that Ascherson and Graebner consider Prof. Bailey's variety to be different, and that he agrees. Var. *robustior* (or *robusta*) Blytt appears to be a *nomen nudum*, As Mr. Williams points out, the small specimens issued by Fries (Herb. Normale) are misleading; and this is confirmed by a reference in *Summa Vegetabilium Scandinaviæ*, 223, under *C. norvegica* Willd.:—"*C. canescenti robustæ*

haud absimilis," *C. norvegica* being a much stouter plant, which points to Blytt's variety being near what we consider to be typical *canescens*. Rev. W. R. Linton cultivated var. *fallax* from Loch nan Eoin, Lochnagar, for many years, and its distinctness was well maintained; my own experience is the same with Ben Lawers roots from Mr. C. P. Hurst, grown in pots.

C. CANESCENS × ECHINATA. I think that the Ben Lawers plant, found by Mr. Druce in 1897, and issued as *C. helvola* Blytt, var., is this hybrid; that was my first impression, and Rev. E. F. Linton, who carefully dissected out a head, quite independently came to the same conclusion. True *C. helvola* (*canescens* × *Lachenalii*) is unlikely to occur anywhere on the Breadalbanes, as *C. Lachenalii* (*lagopina*) seems to be confined in Scotland to the granite of Lochnagar and the Cairngorms. The *canescens* parent in this case would be var. *fallax*. Most of the specimens which have been referred to *C. echinata* var. *grypos* are only a highly-coloured alpine state; my Kingshouse (v.-c. 98 Argyle) plant became typical *echinata* after one year's cultivation. But Mr. Bennett writes that an example of Rev. E. F. Linton's plant from the head of Glen Shee, E. Perth, on which I believe that the original record of *grypos* in Britain rests, was sent to the expert O. Boeckeler, who said:—"I must regard this plant as something entirely unknown." *C. helvola* from Lochnagar, sent by the late Mr. F. C. Crawford to Mr. Linton, has remained constant and sterile for several seasons.

C. CANESCENS × REMOTA. About a dozen years ago I made an unsuccessful search for this in the Wey Valley, between Elstead and Tilford, Surrey, where the two species grow together; but Messrs. C. E. Salmon and Wolley-Dod found a sedge by a stream near Chertsey, on June 17th, 1905, which looks like it, though I am not quite certain about the matter.

In conclusion, I ought to say that the supposed *C. canescens* × *rigida* found on Ben Wyvis by Mr. Crawford and myself, and mentioned in Journ. Bot. 1901, 274, at once changed very greatly in my garden. I can now only call it *C. canescens* var. *fallax*; though Mr. Crawford strongly maintained our original view, as the result of his microscopical dissection of wild specimens.

SHORT NOTES.

SCHŒNUS FERRUGINEUS Huds. = SCIRPUS PAUCIFLORUS Lightf. —In Clarke's *First Records of British Flowering Plants* the date 1777 is given as the earliest record for *Scirpus pauciflorus*, being taken from the *Flora Scotica*, where the species is established by Lightfoot. In working at the Morison Herbarium I have recently come upon an earlier reference, which enables us accurately to identify the plant called *Schœnus ferrugineus* by Hudson (*Fl. Anglica*, 14, 1762), which is wrongly referred to *Scirpus rufus* in

the *Index Kewensis*. Bobart (*Hist. Plant. Oxon*, iii. 245, n. 40) has a species "Gramen *cyperoides minimum caryophylli proliferi capitulo simplici squamato*. Parvula hæc planta folia tenuissima biuncialia profert. Culmus gracillimus capitulum in apice sustinet subrotundum, squamatum, idque *Caryophylli sylvestris proliferi C. B. P. seu Armeriæ proliferæ* Lob. satis æmulum, minus tamen, cum squamis paleaceis sub rectis adnatis." This is represented in his herbarium by a specimen from Lhwyd of *Scirpus pauciflorus*. Linnæus (Sp. Pl. ed. 2, 64, n. 6) cites this description under *Schœnus ferrugineus*. Hudson (*l. c.*) copies from Linnæus the references given to *Hist. Oxon*, even to the clerical errors, citing Bobart's description and also a synonym from Ray. It is only a matter of conjecture what species really represents C. Bauhin's plant in the *Pinax*, or the still earlier name taken from Lobel; but we are on sure ground in treating *Schœnus ferrugineus* Huds. non Linn. as equivalent to *S. pauciflorus* Lightf., and in removing the synonym, taken from *Hist. Oxon*, from *S. ferrugineus* L. Sp. Pl. p. 64. The first printed reference to *S. pauciflorus* may be pushed back to 1690, when Ray (*Synopsis*, p. 210) gives Lhwyd's plant as "*Graminifolia plantula Alpina capitulis Armeriæ proliferæ*. In pascuis ad radicem excelsæ cujusdam rupis y Clogwyn du ymhen y Glyder in agro Arvoniensi. D. Lloyd."—G. Claridge Druce.

Encalypta ciliata var. subciliata Warnst. (Allgem. Bot. Zeitschr. 1899, Beih. i. 30). Among some Aberdeen mosses collected by Mr. G. Stabler in the eighties, and sent to me recently for determination, was a well characterized plant of this variety. The calyptras on the same tuft are indifferently either entirely without fringe at the base, or show traces of a small fringe. In all other characters it agrees with the type. It may be doubted whether on systematic grounds the plant deserves varietal rank; but the student naturally depends so much on the fringed calyptra in the diagnosis of this species that it is at least worth while to draw attention to the existence of the variety and its occurrence in Britain. I gathered it in 1902, in the company of Mr. W. E. Nicholson, in the Pyrenees, but apart from that I am not aware that it has been recorded elsewhere than in the original locality near Toblach in S. Tirol.—H. N. Dixon.

A New Irish Moss.—The discovery in Ireland of a moss hitherto known only as a native of North China will I think interest every bryologist. In May, 1908, while on a visit to the Rev. C. H. Waddell, Vicar of Saintfield, Co. Down, I picked up a small tuft of a *Catharinea*, which has since turned out to be the rare species *C. rhystophyllæ* of C. Müll. On the 5th of February of the present year I paid another visit to my friend, and was lucky enough to gather some more of this moss. As Mr. H. N. Dixon, who kindly verified it for me, is making a communication on the subject, I shall merely add that it was growing in a tuft or sod on the mud-capped top of an old stone fence, associated with *Ceratodon purpureum* and *Stereodon cupressiforme*, and at first

sight bore a superficial resemblance to *Polytrichum aloides*.—H. W. Lett.

Orobanche reticulata Wallr. f. procera Koch in Yorkshire.—Mr. H. E. Craven sent me in the autumn a specimen which he found did not agree with the description of *O. elatior*, and after dissecting a flower I was convinced it would not come under any of our British species; I therefore sent it to Dr. G. Beck, who has so well monographed this difficult genus; he refers it to *O. reticulata* Wallr, as f. *procera* Koch. Like the Continental species, this was parasitic on a thistle, the host being *Cirsium eriophorum*. It was found by Mr. Craven near Leeds, and we owe it to his critical acumen that it was not passed as *elatior*. Further details will be given later.—G. Claridge Druce.

Anagallis arvensis L. (p. 29).—Whatever may be the case in Lincolnshire, I cannot think that "casual colonist" is a good description of its usual standing with us, even in cultivated land. Mr. S. T. Dunn, in his *Alien Flora*, admits it as a native; so do some of our recent county Floras. I feel no doubt about its being wild on many parts of the coast, *e.g.*, on grassy cliffs near the Lizard, at Dawlish Warren, and in sandy ground near Berrow, N. Somerset. Inland, its status is more open to question, though I believe that there also it is not seldom a true native. Like some other annuals, such as *Hypochæris glabra*, it becomes more abundant in light sandy fields; but proof seems to be lacking that it is often, if ever, introduced into tillage with foreign agricultural seed.—Edward S. Marshall.

Hieracium silvaticum Gouan var. tricolor, W. R. Linton in Banffshire.—A hawkweed (my No. 2845) which was gathered in 1895 by Mr. Shoolbred and myself on limestone rocks near Bridge of Avon, Tomintoul, is now accepted by Rev. E. F. Linton as this variety—Rev. A. Ley's original suggestion. Only recorded elsewhere from W. Yorkshire, I believe.—Edward S. Marshall.

REVIEWS.

Life-histories of Familiar Plants. By John J. Ward. Pp. xx. 204. Cassell & Co. 1908. Price 6*s*. With many illustrations from photographs and photomicrographs taken by the author.

Mr. Ward is a keen and enthusiastic field-botanist, familiar with every plant and weed that is to be found in field and meadow, none of which he thinks beneath his study. Not content with knowing what they all are, he has watched them in all their moods, and their behaviour at all times and seasons; he is, moreover, an expert photographer, and many of the plates here reproduced are quite beautiful—as, for instance, the "Rembrandt" frontispiece of the Guelder Rose, the Wild Camomile, the Laburnum, and the Coltsfoot.

Unfortunately, however, as we cannot but think, his chief interest is devoted, not to the life-history of his plants as he can observe them, but to their past evolutionary history as he can fancy it to have been, and as he claims to trace it in the features of the plants themselves. This kind of thing was very much in vogue a quarter of a century ago, but we had hoped that naturalists, taught by experience, had learnt caution, and recognized that such evolutionary histories can pretend to be no more than work of the imagination, ingenious, perhaps, and even plausible, but making no pretence to be scientific.

We may take as a good example of how this system can be worked Mr. Ward's treatment of the Spotted Orchis (p. 131). Many an hour, he tells us, has he puzzled over the mystery of this plant. Its leaves are (at least sometimes) smooth, glossy, deep olive-green, and spotted with stripes and spots of a dark brown pigment, which markings it is that make them so mysterious. "Their growth has always been an insoluble problem," though "undoubtedly they have a definite purpose in the economy of this complex and advanced plant structure"; yet it would seem that no naturalist or botanist has ever offered a suggestion as to their use or meaning. At last, however, Mr. Ward thinks he has caught a glimpse of their significance. They make the leaves somewhat resemble the back of an adder, a reptile which browsing animals have learnt to shun. The explanation, it is confessed, may be thought far-fetched and obscure, and the difficulty is not lessened when we consider that the plant does not usually grow in pastures, and, moreover, that many of these specimens have leaves without spots, and consequently bear no resemblance to adders. So grave does this objection appear that Mr. Ward reinforces his supposition with another: that snakes being now less frequent than they once were, the orchids are in process of losing their spots as constituting no sufficient benefit to make it profitable to retain them. Is it possible to suppose that the cause of science can be advanced by purely fanciful speculations such as these, by which an explanation can with a little ingenuity manifestly be found for everything?

In some cases it is even to be feared that the author's statements may do positive harm, by inducing negligent observers, of whom even nowadays there are far too many, to take assertions for facts, instead of using their own eyes to test their correctness. Thus, for instance, we are told more than once that in plants which grow in crowded situations, such as pastures and thickets, where the competition for light and air is keen, the leaves are usually much divided, as in buttercups and the wild camomile, whereas in those which grow in open spaces we find the leaves large and broad. But, to say nothing of the question as to how the division of leaves into narrow segments may be supposed to assist a plant in its struggle for light and air, and confining ourselves to the prosaic region of facts, which many readers will be inclined to accept as settled by such an assertion as we have heard, what do we find in actual pastures and thickets? Beside

the buttercups, and thriving no worse than they, there will be sorrels and docks, plantains, dandelions, alchemilla, meadow saxifrages, and a host of others, none of which bear out the rule we have heard laid down.

We should fear, therefore, that in spite of his knowledge and industry Mr. Ward may succeed only in making his readers fancy that they know a great deal more about plant-life than any man can possibly know, and may endeavour to secure information—not by the only sound method of careful examination of what actually happens, which in many cases he shows himself eminently qualified to observe and record, but—by imagining how we may conceive present results to have been brought about, and so may deserve to become "evolutionary botanists," who alone, as we are assured, can properly appreciate the history of nature.

J. G.

Lehrbuch der Botanik für Oberrealschulen und Realschulen. Von Dr. Th. Bokorny. 8vo. Pt. 1, pp. vi. 366: pt. 2, pp. 233, tt. 563. Leipzig: Engelmann. 1908. Price 7 marks.

Dr. Bokorny's book is one of those high-class and profusely illustrated junior text-books which indicate that the study of botany holds a much more important place in German than in English schools. The plan is a somewhat novel one. More than a third of the first part consists of descriptions of well-known plants in which are introduced points of general morphology and physiology, the plants serving as object-lessons for the illustration of the elementary principles of the science. Then follows a short chapter on internal structure. The rest of Part 1 contains a systematic review of the plant-world, with brief accounts of the more important orders and families of the Seed-plants and short general accounts of the classes of Cryptogams. An unusual feature in a modern text-book is an illustrated account of the Linnean system, which forms an appendix to the systematic portion. There is also a key for running down the more commonly occurring families, genera and species of seed-plants.

The second part contains a chapter on external morphology, followed by chapters on general physiology and anatomy, and on biology and ecology, with a brief final chapter on plant geography.

The illustrations, which are taken from very various sources, are excellent—it is scarcely an exaggeration to say that they occupy nearly as much space as the text—many are full-page plates, and many recur two or three times; sometimes the repetition is unnecessary. For instance, the well-known full-page figure of the Dragon-tree of Teneriffe occurs three times, with only three pages between its second and third appearance, and other similar cases might be cited. The book is an excellent one of its kind, and should prove of value if used in conjunction with a satisfactory system of practical work.

A. B. R.

Les Mucorinées de la Suisse. Par ALF. LENDNER. 180 pp., 3 pls., and 59 figs. Berne: K. J. Wyss. 1908. Price 7 fr.

THE cryptogamic flora of Switzerland is receiving full justice at the hands of the eminent botanists to whom it has been entrusted, and Lendner's work on the *Mucorini* is well worthy to rank with Fischer's *Uredineæ*. It is an exhaustive treatise of this group of fungi as well as a local florā, and will be found full of interest to all botanists, and more particularly to those who make a special study of the *Phycomycetes*. Questions of biology and histology are discussed. The author gives throughout full accounts of his own experiments and observations, with instructions where and how to find these somewhat obscure moulds, and as to the best methods of growing them. Many of the species were secured by taking soil from woods and other localities, isolating by well-known methods the fungus spores, and growing them on artificial culture media. Lendner was thus able to study the entire development of a very large series of forms. A number of new species have been discovered by him during his investigations, and are described here for the first time. To this thorough method is due the large number of new figures that he has been able to make from the living plants, which greatly enhance the interest of the book.

He divides the *Mucorini* into *Sporangiophoreæ* and *Conidiophoreæ*. The former are by far the larger group, including four families—*Mucoraceæ*, *Thamnidiaceæ*, *Pilobolaceæ*, and *Mortierellaceæ*. The arrangement of genera and species adopted by him differs occasionally from that followed by other systematists, but on the whole it tends to clearness and simplification. In *Absidia*, for instance, he makes the pyriform sporangium the distinguishing character, and under it he includes the genera *Proabsidia*, *Lichtheimia*, *Mycocladus*, and *Tieghemella*, not considering the differences between them and *Absidia* important enough to maintain their generic rank. Lendner's views are not without ample justification, as the founding of genera and species on minor characters is bewildering to the student. A copious bibliography of the subject and a good index are added.

A. L. S.

North American Trees: being Descriptions and Illustrations of the Trees growing independently of cultivation in North America, north of Mexico and the West Indies. By NATHANIEL LORD BRITTON, Ph.D., Sc.D., Director-in-Chief of the New York Botanical Garden, with the assistance of JOHN ADOLPH SHAFER, Pharm.D., Custodian of the Museums. London: Constable. 1908. 4to, cloth. pp. x, 894. Price £1 10*s*.

THIS handsome volume of a thousand pages is another tribute to the energy of the Director of the New York Botanical Garden. He has aimed at producing a book which "shall be available, not alone to persons trained in botany but to any person of ordinary information;" for this purpose he has reduced as far as possible the number of technical terms, and has added a glossary of those

employed. In this aim Dr. Britton may claim to have succeeded: the volume, however, is thoroughly scientific in treatment, the only concession to popular sentiment being in the placing first of "English names" whether for orders, genera, or species, even when these are manufactured for the occasion, as we take to be the case with "Miss Jones' (*sic*) Thorn"—which stands before *Cratægus Jonesæ*, the description of which begins: "Miss Jones' Thorn occurs on Mount Desert island": the next species is "Chapman's Hill Thorn—*Cratægus collina* Chapman."

The descriptions of each tree are full and clear, and the clavis prefixed to each genus should render the identification of the species easy, except perhaps in such genera as *Cratægus*, of which fifty-one species are described. The numerous and excellent figures, to the number of nearly eight hundred, the greater part of which are original, will prove invaluable to those who use the book; the reproductions of photographs of whole trees are a pleasing as well as a useful feature. "The relationships of the native and naturalized trees to those of other parts of the world are discussed, and the products of trees useful in the arts, sciences, and industries are mentioned or described."

The arrangement followed is that of Engler and Prantl; the nomenclature is in the main that of Dr. Britton's *Manual*, but we note that *Broussonetia* is superseded by *Papyrius* of Lamarck—a restoration by Otto Kuntze which seems hitherto to have escaped notice. We cannot think it right to make Linnæus sponsor to such trinominals as "*Betula Alnus glutinosa*." The typography of the book is excellent, save for the ugly initials which begin each order and genus. The "English names" (among which we find "Arbor-vitæs," a name applied in the text to the genus *Thuja*, "Arbol de Hierra" (*sic*), and other unfamiliar titles) and the Latin names are separately indexed.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on 21st January, Dr. Otto Stapf exhibited male and female specimens of *Plagianthus Helmsii* F. Muell. & Tate, and demonstrated with the aid of lantern-slides their peculiar leaf and floral structure, pointing out at the same time that it appears more natural to treat this species, together with *Plagianthus microphyllus* and *P. squamatus*, as members of a distinct genus for which Mueller's name *Halothamnus*, originally applied to *P. microphyllus*, would have to stand. The first paper was by Mr. A. W. Hill, on the genus *Nototriche*, which includes some seventy species formerly placed in the genus *Malvastrum* A. Gray. It is distinguished especially by the absence of an involucre and by the adnation of the peduncles and stipules to the petioles. The species are determined very largely by the character of the leaf lamina, which may be palmatifid or palmatisect, pinnatifid, bipinnatifid, or variously dissected and lobed. The shape of the stipules and the nature of the stellate hairs are

also of value for taxonomic purposes, each species being found to have a definite and characteristic tomentum. Two types of flower are found in the genus, in the one case the petals are almost free and are fused with the staminal column only at the base; in the other, including the majority of the species, there is a definite tube formed by the fusion of the petals with the staminal tube. At the base of each calyx-segment there is a glandular nectary. The carpels are beaked and dehiscent, and are often provided with long silky stellate hairs. In the paper several new species are defined, and the descriptions of those already known have been amplified and re-written. The genus ranges from the north of Ecuador to the Cordillera of Santiago in Chili, some species being found in the Cordillera of Western Argentina. Only two annual species are known. The vertical range of this genus lies between 3900 and 5700 m. in Tropical South America, and is above 2500 m. in Temperate South America. The highest recorded species are *N. flabellata* and *N. Friesii*, which have been found between 5600 and 5700 m.

At the same meeting a paper on the Longitudinal Symmetry of *Centrospermæ* was read by Dr. Percy Groom. By means of measurements of many stems—primary, secondary, tertiary, and quaternary — of one species, *Atriplex rosea*, and of other Chenopodiaceous genera, namely *Salsola* and *Chenopodium*, additional evidence is given that the internode-curve of alternate-leaved *Chenopodiaceæ* is always of a zigzag nature and can be analysed into two subcurves. Of these, one represents the displacement of the leaves from the originally opposite arrangement at the successive nodes, and the other indicates the lengths of the modern representatives of the original internodes. In order to test whether or no opposite phyllotaxis was the original type of arrangement throughout the *Centrospermæ*, and alternate phyllotaxis has been derived therefrom by relative displacement of the leaves, measurements were made of the stems of various *Caryophyllaceæ*, *Aizoaceæ*, *Amarantaceæ*, *Phytolaccaceæ*, and *Portulacaceæ*. It is found that throughout the cohort, in the case of opposite-leaved species the internode curves are regular or tend to be so, whereas in alternate-leaved species the internode-curves are invariably irregular. The irregular zigzag internode-curves of the latter species when analysed into two subcurves generally yield two more or less regular or consistent curves, which largely conform with those of corresponding stems belonging to more typical herbs. The irregularities of the internode-curves of the alternate-leaved species are different, often utterly so, from those of the opposite-leaved species; the irregularities of the former are sudden, recurrent, and often very ample, whereas those of the latter are more gradual, less numerous, and probably largely due to the influence of external variations which are not periodic.

At the meeting of the Society on 4th February the Rev. E. S. Marshall showed the following interesting British plants:—*Saxifraga nivalis* × *stellaris*, n. hybr., found in 1902 on Cairngorm by the late Mr. F. C. Crawford, F.R.S.E. Specimens only in flower,

but quite intermediate in character (see p. 98). *Orchis* ——. Found by Mr. W. A. Shoolbred and himself, in quantity, at Inchnadamph, W. Sutherland; a new form, allied to *O. maculata* L. *Helianthemum Chamæcistus* × *polifolium*, from Purn Hill, Bleadon, N. Somerset; a good intermediate; apparently quite fertile. *Hieracium hyparcticum* (Almq.) Elfstrand, first found in 1890 at Inchnadamph, and again gathered in 1908; a modification of a S. Greenland species. *Hieracium eustales* Linton, from E. and W. Sutherland; an endemic species, previously known only from about four Perthshire stations. This exhibition was followed by Prof. F. E. Weiss, who showed some specimens of *Compsopogon*, a tropical freshwater alga belonging to the *Rhodophyceæ*, which has been found in the Reddish Canal near Stockport. The water in this part of the canal is warmed by the inflow of hot water from the cotton mills, and other subtropical aquatics have been found there in the past—*Naias graminea*, *Chara Braunii*, and *Pithophora Oedogonia*. They are supposed to have been introduced with refuse from the cotton mills.

The fourth volume of Messrs. Elwes and Henry's handsome and important work *The Trees of Great Britain and Ireland* treats of *Abies*, *Castanea*, *Fraxinus*, *Celtis*, *Alnus*, *Betula*, and one or two smaller genera. In this Journal for 1906 (p. 382) we gave some indications of the scope of the undertaking, whose conspicuous merits and less conspicuous but not unimportant defects we then indicated. Further examination has convinced us that, through a certain want of attention to details, the work, invaluable as it is, just falls short of the standard which it might easily have attained. This is notably the case in matters of nomenclature; for example, it is certain that, as indicated by the three recent lists of British plants, the proper name for the tree usually known as *Alnus glutinosa* is *A. rotundifolia* Mill., yet this name is not even given in the synonymy. *Betula verrucosa* Ehrh. (1791) is retained for the tree which was named earlier (1788) by Roth *B. pendula*; in this case both names and dates are cited, so it is not easy to explain the preference. The accompanying plates are as usual admirably selected and beautifully executed; we think, however, they should bear the scientific as well as the "English" name, as the latter is not always recognizable, and the volume has no index.

Our attention has been called to a notice of the three Lists of British Plants published by Mr. F. Arnold Lees in *The Naturalist* for August and September last. It contains suggestive matter, obscured however by the remarkable literary style which has characterized the author's later papers—the *Index Kewensis*, for example, is styled "that learned and laborious Jacksonation of Botanography." Mr. Druce, in the *Annals of Scottish Natural History* for October, begins what promises to be a somewhat lengthy article "on the British Plant Lists and their discrepancies," which will have to be considered when a new edition of the *List of Seed-plants* is called for. It is not easy to understand why the authorship of the *List* is attributed to Mr. Britten, who cannot claim more than a share in the undertaking.

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The Journal of Botany was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

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Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

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LUZULA PALLESCENS Besser AS A BRITISH PLANT.

By Henry & James Groves, F.L.S.

(Plate 496.)

In June 1907 Mr. E. W. Hunnybun of Huntingdon, whilst exploring a piece of original fenland which forms part of Woodwalton Fen, Huntingdonshire, discovered a *Luzula* belonging to the *campestris* section, which he at once recognized as being distinct from the *L. multiflora* Lej. (*L. erecta* Desv.) occurring in the same locality. From a description of *L. pallescens* Besser, Mr. Hunnybun was inclined to refer his plant to that species, as also was the Rev. E. S. Marshall to whom he sent specimens. Mr. A. H. Evans of Cambridge confirmed this view. Mr. Hunnybun subsequently sent the specimens to us, and, after comparing them with the excellent series of the Continental plant at the British Museum, we came to the conclusion that the Woodwalton Fen *Luzula* was undoubtedly the true *L. pallescens* Besser, and, so far as we have been able to find out, an addition to the British flora.

A variety or state of *L. multiflora* with pale perianth-segments and fruits, var. *pallescens* Koch, has been found occasionally and has been confused with the true *L. pallescens*. In this Journal for 1896, p. 368, the Rev. Augustin Ley recorded the occurrence of a *Luzula* in a shady hillside wood near Presteign, Radnorshire, which had been referred by Mr. Arthur Bennett to *L. pallescens* Besser, but upon examination of specimens kindly supplied to us by Mr. Ley it proved to be a pale form of *L. multiflora*.

L. pallescens, as represented by the Huntingdonshire plant, appears to us to be sufficiently distinct from *L. multiflora* to be conveniently kept up as a separate species which may be characterized as follows:—

Luzula pallescens Besser, Enum. Plant. Volhyn. (1822) p. 15 (non Hoppe).

Juncus foliis planis culmo paniculato, spicis ovatis Linnæus, Flora Lapponica (1737) § 127, p. 90, tab. x. fig. 2.

J. campestris β Linn., Sp. Plant. (1753) p. 329.

J. pallescens Wahlenberg, Flora Lapponica (1812) p. 87.

L. campestris var. *pallescens* Wahlenb., Flor. Suec. i. (1824) p. 218.

L. multiflora var. *pallescens* Fries, Summa Veg. Scand. (1846) p. 220 (non Bluff & Fingerh.).

L. sudetica var. *pallescens* P. Ascherson, Verh. Bot. Verein Brandenb. iii. iv. (1862) p. 274.

L. campestris var. *pulchella* Celakovsky, Prodr. Flor. Böhm. (1867) p. 85.

Cæspitose 30–45 cm. high. Stems numerous erect slender bearing usually 2–3 narrow slightly ciliate or almost glabrous leaves. Bracts 1–3 the longest often exceeding the cyme. Cyme

often compound of many (in well-developed examples 10–20) clusters, branches slender, mostly erect, very unequal. Clusters, except the large central sessile one, small roundish oblong or oblong, of 4–20 small flowers. Perianth-segments pale, yellowish-brown at the centre, outer ovate acuminate long-pointed slightly exceeding the fruit, margin towards the apex incurved, about 1·65 to 1·87 mm.* long, about ·6 mm. broad, inner shorter ovate sometimes almost mucronate, about 1·35 to 1·5 mm. long, about ·45 to ·52 mm. broad. Stamens about half the length of the outer perianth-segments, filaments usually slightly longer than the anthers. Fruit dark chestnut brown when ripe, valves including the beak about 1·65 mm. long, about ·97 mm. broad. Seeds minute about ·75 to ·9 mm. long (not including appendage), ·52 to ·6 mm. thick.

A very elegant plant, strikingly different from all the ordinary forms of *L. multiflora*. It may be distinguished from that species by the difference in the size and shape of the inner and outer perianth-segments, in which character it agrees with *L. sudetica* DC. It differs from both *L. multiflora* and *L. sudetica* by the more slender and less rigid stems, narrower leaves, more slender cyme-branches, more numerous clusters, smaller and more numerous flowers, smaller fruits, and minute seeds, the latter being in the Huntingdonshire plant less than a quarter the size of those of *L. multiflora*.

From *L. sudetica* and the ordinary forms of *L. multiflora*, *L. pallescens* differs in the lighter colour of the plant and the pale greenish-brown perianth-segments. In *L. sudetica* the latter are dark brown. Buchenau describes the fruit of *L. pallescens* as "pallidus," but we find the ripe fruit to be dark chestnut brown.

L. pallescens was first described and figured by Linnæus in 1737 in the *Flora Lapponica*, and the specimen from which his figure was taken is preserved in the Linnean Herbarium. After the description quoted above Linnæus adds "Ab antecedenti, [*L. campestris*] ad quem proxime accedit, differt quod 1. *folia* huius glabra sint & angustiora 2. *spicæ* in hac plures, decem vel duodecim 3. *spicæ* huius minores, ovatæ, albicantes sint 4. *pedunculi* spicas parvas sustinentes longiores sint & versus idem latus flexi." In *Species Plantarum* 1753 the plant was reduced to a variety of *Juncus campestris*. It was raised to specific rank under the binominal name *J. pallescens* by Wahlenberg in 1812. Besser merely transferred Wahlenberg's name to *Luzula* without a description.

Dr. Buchenau, the monographer of the *Juncaceæ*, placed *L. multiflora*, *L. sudetica*, and *L. pallescens* as varieties of his large species *L. campestris*, and this course is adopted by some other Continental authors. In dealing with the *Juncaceæ* of the world, as Buchenau did in his Monograph, there may be something to be said in favour of the plan of adopting large aggregate species, such

* The measurements are all taken from the Huntingdonshire specimens.

as that formed by the combination of *L. campestris* and its allies, though such a course is not consistent with his keeping apart the closely related species or varieties *L. arcuata* Wahlenb. and *L. confusa* Lindeb. In dealing with the European flora at any rate we think it better to keep up *L. campestris*, *L. multiflora*, *L. pallescens*, and *L. sudetica* as distinct species. In this country critical botanists have long agreed in separating the first two and the differences between them are well summarized by Syme in *English Botany*, ed. iii. vol. x. p. 10. Ascherson and others have included *L. pallescens* under *L. sudetica* on account of their agreeing in the dissimilarity in the shape and length of the outer and inner perianth-segments, but Dr. Buchenau does not agree with this view, observing (Engler, Pflanzenr. iv. 36 p. 85) "sed id ad naturam mihi non quadrare videtur," and from what we know of the plants we do not think the character in question is sufficiently important to outweigh the numerous other differences between them. It appears to us that *L. pallescens* diverges from *L. multiflora* in the opposite direction from *L. sudetica*.

In Europe *L. pallescens* occurs in Norway, Sweden, Lapland, Finland, Russia, Galicia, Poland, Moravia, Bohemia, and Eastern Germany. Buchenau also records it from Northern Asia and Japan. The discovery of the plant in Britain considerably extends the western limit of its known distribution. As Mr. Hunnybun has suggested, the tiny seeds may well have been brought from one of the European localities in mud on the feet of waterfowl in past ages, when the fenland was much more extensive and Whittlesea Mere still in existence, and when no doubt there were many more species of bird visitors. The Huntingdonshire plant resembles the forms from Eastern Europe rather than those from Scandinavia, which have usually less numerous clusters of flowers.

Last summer one of us (J. G.) had the opportunity under the guidance of Mr. Hunnybun of seeing the plant growing. It occurs in fair quantity on the piece of unreclaimed fenland where it was discovered, but, owing to its small size, slender stems and light colour, it is very inconspicuous among the luxuriant fen vegetation. It seems therefore quite likely that it may be found to occur in other similar situations, more especially as much of the fenland is difficult of access and has probably never been fully explored for plants.

We have not been able to come across in any of the books a good illustration of *L. pallescens*, *Flora Danica* plate 2953 being apparently the pallid form of *L. multiflora*. The plate which accompanies this paper was drawn from the Huntingdonshire plant by Mr. Hunnybun, whose beautiful and accurate studies of British flowering plants are known to many of us.

Explanation of Plate 496.

Luzula pallescens Bess. from Woodwalton Fen, Hunts.

a. Plant, natural size. *b*. Perianth with fruit, × 12. *c*. Outer perianth-segments, × 12. *d*. Inner perianth-segments, × 12. *e*. Seeds, × 12.

SIR GEORGE KING
(1840–1909).

Sir George King, K.C.I.E., F.R.S., LL.D., whose death took place at San Remo, Italy, on 12th February, was born at Peterhead on 12th April, 1840. He was educated at the Grammar School and the University of Aberdeen, where he graduated in medicine in 1865. He entered the Indian Medical Service on 2nd October in that year, and was posted to the Bengal Presidency, arriving in Calcutta in March, 1866. After a short tenure of the post of house surgeon in the Medical College Hospital in that city, King was transferred to military medical duty in Central India and Rajputana, where he gave his leisure time to botanical and zoological studies. In December, 1868, he was deputed to act temporarily as Superintendent of the Botanic Gardens at Saharanpur, in the North-West Provinces, and shortly afterwards was induced to enter the Indian Forest Service, when he was posted to Dehra Dun. While thus employed he was, in 1871, selected by the Secretary of State for India as successor to Dr. Thomas Anderson, Superintendent of the Royal Botanic Garden, Calcutta, and of Cinchona Cultivation in Bengal.

When King took charge of the Calcutta Garden its amenity had been greatly marred by two destructive cyclones in 1864 and again in 1867, and the Cinchona Plantations, established by Dr. Anderson in Sikkim, had just reached the stage at which the extraction of the alkaloids of Cinchona bark on commercial lines was being essayed. The heavy tasks of restoring the Gardens at Calcutta to their former condition and of establishing a factory in connection with the Cinchona plantations tested King's powers of organisation and administration to the utmost. Considerable outlay was required in connection with both undertakings, but from the outset King enjoyed the confidence of the Bengal Government, who placed at his disposal the necessary funds. The result in both cases was complete success; the beauty for which the Calcutta Garden is so deservedly famed bears eloquent testimony to King's energy, patience, and artistic taste, while as a result of his management of the Cinchona department the Government of India has been enabled to place the most effective remedy against malaria within the reach of the poorest inhabitant of the country, without incurring financial loss.

While engaged in the heavy duties involved in these two undertakings, King was able to do much in carrying out a well-conceived botanical survey of the Eastern Himalaya, the English possessions in Indo-China, and the Malayan Peninsula, though he was for many years prevented from devoting much time to the formal presentation of the results of his botanical studies. But as soon as the condition of the Gardens and plantations under his charge justified his taking this step, he founded the *Annals of the Royal Botanic Garden, Calcutta*, and from 1887 onwards he devoted all the time that he could spare to the elaboration of fully

illustrated monographs of difficult and important genera and families, such as *Ficus*, *Quercus*, *Myristica*, *Magnoliaceæ*, *Anonaceæ*, and *Orchidaceæ*. In addition to these monographic studies, he commenced in 1889 the publication of a floristic study of the vegetation of Malaya, in the form of fascicles entitled *Materials for a Flora of the Malayan Peninsula*, which were intended to serve as precursors to, but are so full and accurate that they constitute a satisfactory substitute for, a more finished work. The first ten fascicles, carrying the task to the middle of the *Calycifloræ*, were completed before King retired from India in 1898.

In 1891, when the various botanical officers in India were brought together in a single department, King was appointed the first Director of the Botanical Survey of India.

The services which King rendered to India were not, however, confined to his purely official duties. He was a member of the Senate of the University of Calcutta for many years, and for a time served also on its Syndicate. He was a member of the Board of Visitors of the Bengal Engineering College, an institution in which he took an active interest. He was one of the original members of the Committee of Management of the Calcutta Zoological Gardens, the site of which he found a collection of native huts and converted into a charming and favourite public resort. He was long a Trustee of the Indian Museum, and for a time was Chairman of the Trustees. He was President of the Central Committee appointed to investigate the indigenous drugs of India.

After his retirement King gave the whole of his time to the continuation of his Malayan "Materials." But his health, which had

been severely shaken by serious illness during the last year of his Indian Service, never became completely restored and he realised that the task he had set himself could not be overtaken single-handed. His friend Mr. H. N. Ridley, Director of the Botanic Gardens, Singapore, undertook the elaboration of the Monocotyledonous families, while King continued to deal with the remaining Dicotyledonous ones, and after 1902, when the thirteenth fascicle, completing the Calycifloral families, was issued, his friend Mr. J. S. Gamble became associated with him in working out the Corollifloral orders. But as time went on King's health became steadily—and latterly more rapidly—impaired; he was able to take less and less of an active part in the work, and the concluding Corollifloral families have been worked up by Mr. Gamble alone.

King's wonderful skill and success as a landscape gardener were recognised by the Royal Horticultural Society in the award of its Victoria medal. His great public service in rendering available the alkaloids of Cinchona were rewarded by honorary fellowship of the Pharmaceutical Society, the gift of a ring of honour by the Czar Alexander III. of Russia, by the grade of "Officier d'Instruction Publique," and the conferment in 1890 of a Companionship of the Order of the Indian Empire. His services to science led to his promotion to the degree of LL.D. in his own University in 1884, his election into the Royal Society in 1887, honorary association with many learned societies, and the award of medals by the University of Upsala and the Linnean Society of London. In recognition of his success as an administrative officer he was, on the eve of retirement, made a K.C.I.E.

His kindly disposition, his broad outlook on life, and the magnetic charm of his manner, led to his forming an extensive circle of acquaintances. A wise counsellor and an unfailing friend, his loss to those who were privileged to come intimately into contact with him is irreparable.

[For the portrait accompanying this notice we are indebted to the courtesy of the proprietors of *The Gardeners' Chronicle*.]

SOME NEW JAMAICA ORCHIDS.—II.

By W. Fawcett, B.Sc., F.L.S., & A. B. Rendle, D.Sc., F.L.S.

(Continued from p. 8.)

Pleurothallis jamaicensis Rolfe. Herba cæspitosa, caulibus secondariis abbreviatis foliis æquilongis; vaginæ ochreatæ, apiculatæ, venosæ. Folia breviter petiolata, elliptica, obtusa, coriacea. Racemi breviter pedunculati, pauciflori vel uniflori, foliis duplo vel triplo breviores. Bracteæ ochreatæ, breviter acuminatæ. Sepala subpatentia, ovato-lanceolata, acuta, lateralia basi brevissime connata. Petala lineari-lanceolata, acuminata. Labellum lineare, apice obtusum, recurvum. Columna tenuis, curvata.

Secondary stems 1–2 cm. Leaves 1·5–2·5 cm. l., about 1 cm. br.

Racemes 1–1·5 cm. l. Bracts 2 mm. l. Flowers light reddish purple with a darker lip. Sepals 7–8 mm. l. Petals rather shorter than sepals. Lip 2 mm. l. Column 1 mm. l.

Hab.—Jamaica, without locality, *Morris*! Flowered at Kew in September, 1886, and on subsequent occasions.

A dwarf species of the section *Lepanthiformes*, not well comparable with another. The short secondary stems keep it out of the section *Apodæ cæspitosæ*, and the ochreate stem-sheaths bring it into the section named.

We are indebted for the above description to Mr. R. A. Rolfe, who had named the plant in MS. in the Kew Herbarium.

Epidendrum parvilobum (§ ENCYCLIUM, SPHÆROCHILA). Pseudobulbi lanceolato-ovati, apice monophylli, vaginis duobus, scariosis tecti. Folia lineari-ligulata, obtusa, basi conduplicata, nervis multis prominentibus. Panicula folio multo longior, laxe pauciflora, inferne bracteis vaginatis, parvis, obtusis, superne bracteis florentibus deltoideis, semiamplexicaulibus, breviter acutis instructa. Sepala ovalia, 5-nervia, obtusa, lateralia dorsali paullo breviora. Petala sepalo dorsali paullo breviora, oblanceolato-oblonga, reticulato-3-nervia. Labellum petalis æquilongum, longitudine latius, usque ad basin liberum, trilobatum, lobis lateralibus obovatis, subrotundatis, lobo medio parvo, semiorbiculato, minute apiculato, disco lineis tribus crassis, elevatis, atque basin versus callo magno instructo. Columna parva, sepalorum 1–3 longitudine, apice dilatata, alata, clinandrio denticulato.

Plant 2 ft. high. Pseudobulbs 3–5 cm. l. Leaf 22 cm. l., 1·5–2 cm. br. Bracts (sterile) 5–10 mm. l., (floral) 1·5–2 mm. l. Pedicels 7 mm. l. Sepals, dorsal 10 mm. l., 4 mm. br., lateral 8 mm. l., 4 mm. br. Petals 8 mm. l., 2·5 mm. br. Lip 8 mm. l., 10 mm. br. Column 3 mm. l.

Hab.—On trees; fl. in May; Dolphin Head, 1600 ft., 10,439, *Harris*!

Epidendrum belvederense (§ ENCYCLIUM, HYMENOCHILA). Pseudobulbi lanceolato-ovati, apice diphylli, vaginis scariosis tecti. Folia lineari-ligulata, obtusa, basi conduplicata, nervis multis prominentibus. Panicula folio multo longior, laxe pauciflora, inferne bracteis vaginatis parvis obtusis, superne bracteis florentibus deltoideis semiamplexicaulibus breviter acutis, instructa. Sepala oblongo-lanceolata, subacuta, 5–7-nervia; lateralia dorsali paullo latiora sub apice leviter carinata. Petala sepalis æquilonga oblanceolata reticulato-8-nervia. Labellum petalis paululo brevius, usque ad basin liberum, reticulato-nervosum, nervis 3 medianis crassis elevatis præcipue in disco, trilobatum; lobis lateralibus brevibus, obtuse triangularibus; medio multo majore, rotundato-ovato breviter apiculato. Columna robusta, antice plana, dorso teres; androclinio 3-dentato, antice auriculato. Capsula fusiformis.

Plant 1½ ft. high. Pseudobulbs about 4 cm. l., about 1 cm. br. Leaves 16–18 cm. l., 15–18 mm. br. Bracts (sterile) 7–8 mm. l., (floral) 2–3 mm. l. Pedicels 1 cm. l. Sepals 1·3 cm. l., dorsal

3 mm. br., lateral 3·5 mm. br. Petals 1·3 cm. l., 3 mm. br. Lip 1·2 cm. l., 9 mm. br., lateral lobe 2 mm. l. Column, including anther, 7·5 mm. l. Capsule 3 cm. l., 1 cm. br.

Hab.—On trees; in fruit Jan.; Belvedere, Hanover, 500 ft., 7620, *Harris*!

This species is near *E. parvilobum* in habit, but differs in the diphyllous pseudobulb, and in the lip and sepals.

Epidendrum monticolum (§ Encyclium, Hymenochila). Pseudobulbi ovoidei, apice monophylli vel interdum diphylli, vaginis scariosis tecti. Folia lineari-ligulata, obtusa, basi conduplicata, nervis multis vix prominentibus. Scapus folio æquilongus vel brevior, laxe pauciflorus, rugulosus, bracteis inferne vaginatis parvis subacutis, florentibus semiamplexicaulibus subacutis instructus. Ovarium jam tumescens cum pedicellis verruculosum. Sepala lanceolato-oblonga subacuta crassiuscula reticulato-6–7-nervia. Petala sepalis paullo breviora, oblanceolato-ovalia, obtusa, reticulato-3–4-nervia. Labellum petalis æquilongum, usque ad basin liberum, breviter lateque unguiculatum, profunde trilobatum; lobis lateralibus oblongis, obtusis; lobo medio multo majore, suborbiculari, late unguiculato, apice subapiculato, margine inferne leviter crispulo, venis elevatis, ramosis, divergentibus percurso, basi in callis geminis crassis disci convergentibus. Columna sepalis duplo brevior, robusta, alata, apice auriculata.

Pseudobulb 1·5–2 cm. l. Leaf 12–22 cm. l., 7–10 mm. br. Scape 11 cm. Bracts, sterile 8 mm. l., floral 2–3 mm. l. Pedicels 1 cm. l. Sepals dark green, 1 cm. l., 3 mm. br. Petals green, 9 mm. l., 3 mm. br. Lip brownish-yellow, 9 mm. l., middle lobe 6 mm. l., 5–6 mm. br. Ovary (apparently fertilized) 15–17 mm. l. Column 5 mm. l.

Hab.—Holly Mount, Mt. Diabolo; fl. in Feb., 10,467, *Harris*!

Allied to *E. tampense* Lindl., which differs in shape of petals, absence of warts on the ovary, &c.; also to *E. fucatum* Lindl., which has a many-flowered paniculate inflorescence. The Peruvian *E. scleroclad*ium Lindl., an allied species with a verruculose ovary, differs in the shape of the sepals, petals, and lip. The Brazilian *E. bracteatum* Barb. Rodr. differs in the leaf, in the size of the flowers, and in the lip.

Epidendrum angustilobum (§ Eu-epidendrum, Planifolia Umbellata). Caulis elongatus, erectus, robustus, ad basin teres, supra basin denudatus, superne compressus, foliorum vaginis tectus, apice bifoliatus. Folia ovalia aut elliptico-oblonga, coriacea, obtusa, multinervia, basi amplexicaulia et longe vaginantia; vaginæ compressæ, leviter carinatæ. Paniculæ rachis vix evolutus et vaginis tectus; bracteæ basi vaginantes ovato-oblongæ acutæ vel subacuminatæ. Flos magnus solitarius. Ovarium longissimum. Sepala anguste oblanceolata, acuminata, multinervulosa. Petala sepalis æquilonga, linearia, longe acuminata. Labellum sepalis paullo brevius, profunde 3-lobatum, lobis lateralibus linearibus acuminatis, medio triplo longiore, lineari, longe acuminato, disco ad basin lamellis duobus angustis parallelis instructo. Columna

elongata, superne valde dilatata atque auriculata, supra medium cum labello connata, clinandrio lobis ovatis postice tribus acuminatis et antice tribus, medio acuminato, lateralibus obtusis.

Stem 5 dm. l., 4–10 mm. br. Leaves, blade about 11 cm. l., 4–5 cm. br. Bracts 7–8 mm. l. Flower cream-coloured. Ovary 12·5 cm. l. Sepals 4·2–4·3 cm. l. Lip, middle lobe 2·2 cm. l., 1 mm. br., lateral lobes 7 mm. l., barely 1 mm. br. Column 2 cm. l., connate with lip about three-quarters of its length; anther purplish.

Hab.—In fl., Oct.; Rose Hill, 4000 ft., 10,485, *Harris*!

This species is very near *E. nocturnum* Jacq., but differs in the small slender lip-lobes, auricled column, lower attachment of lip to column and longer ovary; the broader leaves resemble those of the vars. *latifolium* and *tridens*.

NEO-URBANIA (gen. nov.). Herba in ripis saxosis umbrosis procumbens, caulibus elongatis, foliosis, ramosis, internodis inferioribus radicantibus. Folia alterna, angusta, vaginis arcte appressis, persistentibus. Flores parvuli, in axillis foliorum fasciculati, pauci, pedicellati. Sepala subæquilonga et subæquilata, conniventia, posticum liberum, lateralia pedi columnæ adnata, mentum sub labello formantia. Petala sepalis similia. Labellum 3-lobum, ad apicem pedis columnæ articulatum, in pedem incumbens, supra basin lobis lateralibus ad columnam spectantibus; lamina recurvo-patenti ovali. Columna brevissima erecta, exalata, basi in pedem longe producta; clinandrium leviter concavum, integrum, linea mediana elevata in rostellum parum punctiforme terminata; anthera terminalis, opercularis, incumbens, galeata, bilocularis; pollinia 4, cerea, pyriformia, æqualia, a latere compressa, per paria in loculis collateralia, inappendiculata, libera. Capsula elongata, oblonga, breviter rostrata.

Differs from *Ponera* in its free, simple pollinia and axillary flowers; from *Pleuranthium* in the lip, which is free from, and attached to the foot of, the column, and in the pollinia; from *Camaridium* in habit, in character of the pollinia (absence of gland and stipes), and in the connivent perianth.

Dedicated to Prof. Dr. Ignatius Urban, who has done so much for the botany of the West Indies.

Neo-urbania adendrobium. *Ponera adendrobium* Reichenb. f. in Flora, xlviii. 278 (1865); sub *Pleuranthio* Benth. & Hook. Gen. Pl. iii. 526 (1883); *Camaridium parviflorum* Fawc. in Symb. Ant. i. 472 (1900). Folia lineari-lanceolata, subacuminata. Sepala sub-acuminata, dorsale oblongum; lateralia oblongo-elliptica. Petala oblonga, acuminata, tri-nervia. Labelli lobus medius margine undulato, apice emarginato; disco ad basin bi-calloso, uni-nervi, tergo tri-nervi et ad basin calloso, infra apicem apiculo calloso instructo. Capsula costis parum prominulis.

Plant several feet in length; internodes 2–4 cm. l. Leaves 12–15 cm. l., 2 cm. br. Peduncle 7 mm. l. Pedicel 7·5 mm. l. Bract subtending the fascicle, scarious, 1·1 cm. l. Bract at the base of the peduncle, scarious, 1 cm. l.; at base of the pedicel,

scarious, 8 mm. l.; bracteole below the ovary 1·3 mm. l. Flowers white. Sepals 5·5 mm. l. Petals 5 mm. l. Lip, middle lobe, 3 mm. l., nearly 3 mm. br. Column 2 mm. l.; foot 2 mm. l. Ovary 8 mm. l. Capsule (unripe) 1·6 cm. l.

Hab.—On stony banks under shade; in fl. and fr. Sept.–March; Lancaster, 2500 ft., 7650, 7696, 7874, *Harris*!

Habenaria jamaicensis. Caulis basi paucifoliatus. Folia 3, 4-ve, inferiora rotundato-ovalia, obtusissima, superiora ovalia, acuta; amplexicaulia, brevissime vaginata. Racemus laxiter 4–12-florus. Bracteæ membranaceæ, ovato-lanceolatæ lanceolatæve, acutæ acuminatæve, amplexicaules; steriles 2–4, plus minus distantes, breviter amplexicaules; florales ovario subæquilongæ. Sepala, dorsale ovato-suborbiculare, obtusissimum, cucullatum; lateralia deflexa, semi-ovata, subfalcata, obtusa, apiculata, dorsali paullo longiora. Petala 2-partita, partitionibus valde inæqualibus; posteriore oblongo-lanceolato, falcato, acuto, conniventi, sepalo dorsali paullo breviore; anteriore subulato, erecto, brevi, quam posterior multoties breviore. Labellum usque ad basin 3-partitum, medio lobo lineari-ligulato, lobis lateralibus plerumque breviore; lobis lateralibus filiformibus, erectis, quam petalorum partitiones posteriores multo longioribus; calcare pendulo, tenui, leviter clavato, obtuso, ovario subæquilongo; processubus stigmaticis brevibus, truncato-rotundatis; antheræ canalibus subæqualibus, leviter curvatis; staminodibus breviter triangularibus.

Plant 1·5–3 dm. l. Leaves 3–9 cm. l., 1·5–4·5 cm. br. Raceme 4–15 cm. l. Bracts, sterile 5–2 cm. l., floral 2·5–1·5 cm. l. Pedicels about 5 mm. l. Flowers greenish. Sepals, dorsal 6–7 mm. l., 4·5–6 mm. br., lateral 6·5–9 mm. l., 3·5–4 mm. br. Petals, posterior segment 5·5–7 mm. l., 1·5–2 mm. br.; anterior segment 1·5–2 mm l. Lip, middle lobe, 6·5–10 mm. l., about 1 mm. br.; lateral 9–12 mm. l.; spur 13–16 mm. l.

Hab.—On rocky or clayey, shady banks, in flower, Dec.–April, Mt. Hybla, 4000 ft., 7851; Clydesdale, 4000–4500 ft., 7854; Moody's Gap, 3000 ft., 7768; near Cinchona, 4500 ft., 10,449; *Harris*!

Resembles *H. distans* Griseb. in the aggregation of the leaves at the base of the stem, and generally in the shape of the leaves, though those of *H. distans* are longer. Grisebach's species also differs in the bracts being about as long as, or longer than, the flower; and in the anterior segment of the petal being about equal to the posterior.

Lepanthes Wullschlaegelii. Typus in Herbario Regio Monacensi. Herba parva, caulibus folia ovalia, breviter acuminata longe excedentibus; vaginæ longæ graciles ore ovato acuminato striisque ciliolatæ. Racemi multiflori, foliis breviores; floribus distichis; bracteis ciliolatis, amplexicaulibus, late ovatis. Sepala ovata, acuta, coccinea; lateralia ½-connata. Petala obverse deltoidea, apice abrupte apiculato. Labellum ad basin in lobos duos divaricatum, marginibus superis lanceolatis incrassatis columnam longam amplectentibus. Capsula parva, obovoidea.

Stem 2·5–6 cm. l. Leaves 2–2·5 cm. l., about 1 cm. br. Bracts 1–1·2 mm. l. Sepals, lateral, nearly 2 mm. l., 1·75 mm. br.; dorsal, nearly 2 mm. l., 1·2 mm. br. Petals 1·3–1·4 mm. br. Lip, upper surfaces ·6 mm. l. Column ·8 mm. l. Capsule 2·5 mm. l.

Hab.—Beaufort, 1078, *Wullschlaegel*!

Closely resembles *L. divaricata* in habit, but the structure of the flower brings it near to *L. obtusa* and *L. Woodiana*.

Campylocentrum Barrettiæ. Radices subgraciles, longæ, flexuosæ, canescentes, simplices. Caulis dense foliata, subrobustus, leviter compressus, radices emittens, simplex, vaginis tectus, basi subnudus. Folia disticha, laminæ majusculæ, subcoriaceæ, oblongo-ligulatæ, basi angustatæ, apice alte valdeque oblique bilobato, caducæ; nervo medio infra prominenti, supra canaliculato; nervis lateralibus multis; vaginis arcte appressis, valde nervosis. Spicæ multifloræ foliis oppositæ et his multo breviores, solitariæ, interdum geminæ, floribus sessilibus. Bracteæ triangulares, acutæ. Sepala ligulata, apice subacuto leviterque apiculato, concava, 3-nervia; lateralia basi subobliqua, non constricta. Petala lineari-lanceolata, acuta, 3-nervia, marginibus involutis. Labellum supra 5-nervia, basi 7-nervia, obsolete 3-lobatum, sepalis æquilongum; lobo medio lineari-lanceolato, acuto, quam labellum duplo breviori; lobus lateralibus obtuse rotundatis, antice non evolutis; calcare lineari, anguste clavato, basi leviter constricto, sepalis multo breviori, sub anthesi recto aut paullo curvato, demum patenti. Capsula (immatura) elongata, anguste oblonga, recta.

Roots 1–3 dm. l., 1–2 mm. br. Stem 5-26 cm. l., 2-3 mm. br. Leaves 3–7 cm. l., 8–15 mm. br.; sheaths 6–15 mm. l. Spikes 1–2·7 cm. l. Bracts 1 mm. l. Sepals a little over 4 mm. l. and 1 mm. br. Petals 4 mm. l., 1 mm. br. Lip as long as the sepals, 2 mm. br.; middle lobe 2 mm. l., nearly 1 mm. br. at base. Spur 2 mm. l., nearly 1 mm. br. Capsule (unripe) 1 cm. l.

Hab.—On trees, in flower, Oct.–Jan., near Brown's Town, *Miss T. M. Barrett*! August Town, *Moore*! Charlemont, near Ewarton, 1000 ft., 6580; near Gordon Town, 7801; Green Vale, 2000 ft., 10,405, 10,406; near Brown's Town, 1200 ft., 7172, *Harris*! Albany, St. George, *Watt*!

Dedicated to Miss Terry Moulton Barrett, who contributed a large number of native orchids to the Botanical Department, Jamaica.

Near *C. micranthum* Lindl., but distinguishvd by the shorter spur and lip characters.

Campylocentrum minus. Radices et caulis ut in *C. Barrettiæ*. Folia disticha; laminæ majusculæ, submembranaceæ, ellipticæ, vel oblongo-ligulatæ, apice obtusæ, raro leviter 2-lobatæ, caducæ; nervo medio infra prominenti, supra canaliculato; nervis lateralibus multis; vaginis arcte appressis, valde nervosis. Spicæ multifloræ foliis oppositæ et his æquilongæ aut longiores, 2–4-fasciculatæ, floribus sessilibus. Bracteæ triangulares, acutæ. Sepala enervia, posticum lineari-lanceolatum, acutum, lateralibus breviora; lateralia lineari-lanceolata, acuta. Petala lineari-lanceolata, acuta,

enervia. Labellum enerve, obsolete 3-lobatum; lobo medio triangulari, acuto, marginibus involutis, quam labellum plus duplo breviori; lobis lateralibus rotundatis, antice vix prominentibus; calcare ellipsoideo, basi constricto, sepalis multo breviori, patenti. Capsula (immatura) anguste oblonga, 6-costata.

Roots to 2 dm. l., 1–1·5 mm. br. Stem to 16 cm. l., about 2 mm. br. Leaves 3–4 cm. l., 7–12 mm. br.; sheaths 6–8 mm. l. Spikes to 4 cm. l. Bracts 2 mm. l., more than 2 mm. br. Sepals, dorsal, 2·3 mm. l., barely 1 mm. br.; lateral, 2·6 mm. l., ·7 mm. br. Petals 2 mm. l., ·6 mm. br. Lip 2·5 mm. l., barely 2 mm. br.; middle lobe about 1 mm. l. Spur 1·5 mm. l., ·7 mm. br. Capsule 6 mm. l.

Hab.—On trees; in flower, Dec., in fruit, Jan.; Cedar Hurst, *Harris*!

Campylocentrum Sullivanii. Herba acaulis, aphylla. Radices subgraciles, longæ, flexuosæ, canescentes, simplices. Spicæ radicales, 4–7-fasciculatæ; floribus minutis, multis, distichis. Bracteæ ovatæ, acutæ, amplexicaules. Pedicelli breves. Ovarium obovoideum. Sepala 1-nervia, dorsale ovatum, acutum, apiculatum; lateralia ovato-lanceolata, apiculata. Petala 1-nervia, ovalia vel ovato-elliptica, subacuta. Labellum 3-lobatum, 7-nerve; lobo medio triangulari, acuto, apiculato; lateralibus rotundatis; calcare clavato.

Raceme 1–2 inches l. Roots to 3 dm. l., 1·5–2 mm. br. Spikes 3-6 cm. l. Bracts 1·7 mm. l., 1·3 mm. br. Pedicels about ·7 mm. l. Ovary 1·5–2 mm. l., nearly 1 mm. br. Flowers brownish-white. Sepals 1·4–1·7 mm. l., ·8 mm. br.; lateral 1·7–1·8 mm. l., ·7–·8 mm. br. Petals 1·25 mm. l., ·6–·7 mm. br. Lip 1·3 mm. l., 1·3 mm. br., middle lobe ·25 mm. l.; spur 1·1 mm. l. Column green.

Hab.—On trees; in flower, Jan.–March; Spaldings, *Sullivan*! Monklands, *Roberts*! Alexandria, Ramble, *Mrs. Rankine*! Belvedere, Hanover, 500 ft., 7523, *Harris*! near Hope Bay, 10,464, *Moore*!

Near the Brazilian species *C. tenue* Rolfe, but distinguished by characters of spur and lip.

The name is given in honour of Mr. Charles Sullivan, who was for some years an assistant in the Botanical Department, Jamaica, and collected a large number of Orchids and other plants.

We append descriptions of two new plants which are closely allied to Jamaican species.

Liparis retusa. *L. neuroglossa* Rolfe in Bull. N. York Bot. Gard. iv. 454 (1907), non Reichenb. f. Rhizoma repens, ramosum. Caules erecti, basi vaginis tribus, obtusis, albescentibus, membranaceis, amplis tecti. Folia singula, cordata, petiolo vaginante. Racemus pluriflorus, subcongestus. Bracteæ lanceolatæ, acutæ, quam pedicelli plus duplo breviores. Sepala 1-nervia, lateralia

lanceolata, dorsale angustius. Petala linearia. Labellum suborbiculare, apice late retuso, apiculato, marginibus lateralibus breviter fimbriatis. Columna gracillima, curvata.

Leaf 3–4 cm. l. and br. Bracts 3 mm. l. Pedicels with ovaries 7 mm. l. Sepals, lateral 5 mm. l., 2 mm. br., dorsal 6·5 mm. l., 1·5 mm. br. Petals nearly 7 mm. l., less than ·5 mm. br., deep crimson. Lip, length from base to apex barely 6 mm., extreme length to apex of lobes 7 mm., breadth 7 mm., marked by deep crimson veins radiating from base. Column 3·5 mm. l., reaching about half-way up the lip.

Plantæ Bolivianæ, a Miguel Bang lectæ, no. 1787.

Differs from *L. neuroglossa* in the larger flowers, narrower and longer petals, shape of sepals and lip, and relatively shorter column. In *L. neuroglossa* the sepals are oblong, lateral, 4 mm. l., 1·75 mm. br., dorsal 5·5 mm. l.; the petals are 5–5·5 mm. l.; the lip is cuneate, with broad, shortly bilobed apex and short median cusp, 4·5 mm. l. from base to apex, barely 5 mm. br. Column over 3 mm. l., reaching about two-thirds up the lip.

In the Jamaican *L. cardiophylla* Ames, which scarcely differs from *L. neuroglossa*, the sepals are 4 mm. l., 1 mm. br.; petals 4–5 mm. l.; lip of similar form as *L. neuroglossa*, barely 4 mm. br.; column a little over 2 mm. l.

Pleurothallis confusa. *P. Wilsoni* Lindl. in Ann. Nat. Hist. ser. 3, i. 326 (1858) (partim), and Fol. Orch. 17 (1859); Griseb. Fl. Brit. W. Ind. 608 (1864) (partim). Herba pusilla rhizomate repente. Caulis filiformis, infra laxis vaginis instructus. Folium sessile, anguste ovale, cauli æquilongum. Pedunculi solitarii, 1-flori. Bractea ochreata, truncata, obtusa. Sepala elliptica, obtusa, 3-nervia, carinata; lateralia $\frac{2}{3}$-connata. Petala oblanceolata, acuta, margine superiore leviter undulato-crenulato. Labellum lobis duobus parvis basi utrinque, superiore fere obsoleto instructum; lobo medio rotundato, fere usque apicem 3-nervi, margine velut superficie minute papilloso. Capsula ellipsoidea, leviter 3-carinata.

Stem about 2 cm. l. Leaf 1·5–2 cm. l., 5–6 mm. br. Peduncles 3–5 mm. l. Bract about 1 mm. l. Sepals 3·5 mm. l., dorsal 1·5 mm. br., lateral (together) 2·5 mm. br. Petals 2 mm. l., ·5 mm. br. Lip 2·5 mm. l., 1·6 mm. br.

Hab.—Cuba, 668 (660 in Herb. Mus. Brit.), *Wright*!

Lindley included two plants in his description of *P. Wilsoni*—one from Cuba, Wright 668, and the other from Jamaica, Wilson. The two plants differ remarkably in the conformation of the lip, and must therefore be regarded as distinct species. We retain the name *P. Wilsoni* for the Jamaican plant, gathered by Wilson, as Lindley's description of the lip evidently refers to it, and not to the Cuban plant.

(To be continued.)

WAYFARING NOTES IN RHODESIA.

By R. F. Rand, M.D., F.L.S.

(Continued from p. 86.)

The following three examples illustrate protandry in Rubiaceous plants:—

Fadogia obovata N. E. Br. No. 1348. The triangular stem and the branching in whorls of three are interesting vegetative features. The anthers, sessile in the throat of the corolla-tube, dehisce before the petal-lobes unfold, so that the stylar head emerges, passing to wide exsertion, coated with pollen. At this stage the stylar head functions solely as pollen-presenter. It is a short, hollow cylinder closed at its distal end and swings upon the style much as one might pivot a hat upon the end of a walking-stick. Ten vertical ridges with their intervening furrows mark the sides of the cylinder. These sides are non-stigmatic. The stigma occupies the crown of the stylar-head; its lobes, five in this instance, unfold later in the life of the flower.

Vangueria rhodesiana, sp. nov.* No. 1349 affords an interesting variation. The floral tube is shorter than in the preceding instance, the corolla-lobes more deeply cut. The anthers dehisce immediately before the flower opens, the pollen being shed upon the stylar-head, which in shape resembles an inverted flower-pot. Wide exsertion does not take place, the head just clearing the throat of the tube. With the expansion of the flower the short filaments bend outwards, the anthers occupying the

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* [**Vangueria rhodesiana** S. Moore, sp. nov. Fruticulus pumilus caule abbreviato sat valido ramulos perpaucos ascendentes dense ferrugineo-hirtos gerente, foliis oblongo-obovatis obtusissimis vel subito obtusatis basi in petiolum brevem angustatis chartaceis utrinque præsertim in nervis appresse hispidulis, stipulis in vaginam connatis basi latis ovatis dorso sparsim hispidulis in caudam brevem hispidulam subito exeuntibus, floribus ad normam generis magnis 5–6-meris pedicellatis in cymis axillaribus pedunculatis quam folia brevioribus paucifloris ferrugineo-hirtulis dispositis, bracteis ovatis vel oblongo-obovatis obtusis pedicellum circa æquantibus, ovario 5–6-loculo hemisphærico sparsim hirtulo quam calyx fere glaber in lobos oblongos acutos margine ciliatos alte divisus breviore, corollæ tubo late cylindrico lobis oblongo-lanceolatis acuminatis quam tubus paullo longioribus, filamentis corollæ ori affixis brevibus antheris exsertis oblongo-ovatis obtusis, stylo corollæ tubum æquante crasso sursum leviter attenuato, stigmate longitrorsum sulcato inferne truncato ore lobulato.

Planta summum 7 cm. alt. Foliorum limbus 7–8 cm. long., 4–4·5 cm. lat.; costæ ord. secundi utrinque 4–5, ad angulos varios costæ centrali insertæ, apertissime arcuatæ; petiolus 5–8 mm. long., ferrugineo-hirtus. Stipulæ 8·5 mm. long., pars basalis 5 mm., cauda 3·5 mm. long. Cymæ rite evolutæ (corollis inclusis) circa 3 × 1·5 cm. Bracteæ 5–6 mm. long. Pedunculus ± 12 mm. long. Pedicelli 5–7 mm. long. Ovarium 3 mm., calyx totus 7 mm., lobi 5 mm. long., hi apice crassiusculi, inflexi. Corollæ tubus 7 mm. long., lobi 8 mm. Filamenta circa 1 mm. long.; antheræ 3 × 1·25 mm. Stylus 7 mm. long.; stigma 2 × 1·75 mm.

Easily recognized by the clothing of stem-leaves and inflorescences, and the relatively large flowers.—S. M.]

intervals between adjacent corollal segments. Later on, the stigmatic lobes at the crown of the stylar-head open out. In the final stage of the flower the anthers are to be seen rising up again to cluster around the stigma.

PAVETTA STIPULOPALLIUM K. Schum. No. 1350. Here the stylar-head is long and shaped like an attenuated Indian club. There is a small cleft at its extremity. The outer surface bears eight vertical rows of short, bristly hairs, and may fairly be described as of bottle-brush type. The anthers are very long and sessile in the throat of the corolla-tube. They dehisce before the flower opens. The style emerges coated with pollen, and rapidly grows out to a wide exsertion. It acts as pollen-presenter. Later in the life of the flower the lips of the cleft at the extremity become swollen, slight separation of the lobes occurring at the same time. The lobes are slightly unequal, and never become widely separated. Here the true stigmatic surface is to be found. It would seem as though the presence of pollen upon the stylar-brush inhibited development in the stigma, the stigmatic surface being seen best developed where the stylar-brushes were least encumbered.

An interesting point is the mutual adaptation shown between the very long sessile anthers and the long brush of the stylar-head. In all three of the foregoing examples introrse dehiscence of the anthers is, as might be supposed, a tributary accompaniment.

OCHNA sp.* No. 1351. The appearance of the bark of this species is noteworthy. It cracks in a series of regularly disposed horizontal rings, averaging from half to three-quarters of an inch interspace, in medium-sized wood. In the younger branches the rings are more closely set, in the older wood they are wider apart and less well-defined. The attendant vertical cracks are not so straight, and even they lie, upon an average, from a quarter to half an inch apart. The two sets of cracks divide the surface up into rude parallelograms, giving a mailed effect sufficiently characteristic to enable the observer to identify the tree by the bark alone.

Some Asclepiads are sent herewith; Nos. 1352, 1353, 1354, 1355, 1356, 1357, 1358, 1359, 1360, and 1361 are referred to in the following notes.

Many of the flowers are long-lived, as one might expect where specialization has been carried to so high a pitch. The dull coloration, of the smaller flowers especially, renders certain of them singularly inconspicuous. The *pose* of the flower, whether erect or pendulous, seems worthy of mention. A few notes are appended in connection with the translator mechanism, a feature probably only to be adequately made out in fresh specimens. The variations in detail of the translator are so many that one is driven to the conclusion that in many instances the adaptation

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* [May be allied to *O. humilis* Engl., but flowers are required to determine this.—E. G. B.]

is fitted to the conformation of some particular insect. The wondrous variations seen in the forms of the cuculli are probably means to the same end.

The pollinium is frequently left only partially engaged in the slit, and how it is propelled into the deep, recessed portion of the stigmatic chamber is not clear. The edges of the slit are in some cases held together by a spring-like compression of the valvular walls. The valves are frequently horny in texture, and, if held apart and released, spring together again. Where, as in some instances, the valves are set with inwardly-directed teeth, the spring-like compression may direct and urge the slippery pollinium inwards, but in many cases no teeth exist. In some cases the margins of the slit are lip-like, swollen, and turgid, and here a variation in turgidity may act as the propelling force.

One may examine many flowers before finding a trapped pollinium. Flowers from which the pollinia have been carried off are more commonly seen. There must needs be adaptation between the pollinium and the slit it is destined to occupy. A narrow slit calls for a flattened pollinium. Where the valves are in close contact throughout, with no definite orifice at the angle, and no divergence below, the extremely flattened pollinium, as seen in the fly-wing type, may be confidently looked for. Some pollinia have a portion differentiated off, whose special function it is to engage the slit. As to the approximation of the pollinia after dislodgment from their thecæ, drying-up plays its part, no doubt, dry weather being assumed to be present. In some cases the wide translator mechanism appears to be in a state of tension, and there may be elastic recoil when it is displaced from its setting. The corpusculum, especially if large, may be a leading factor in drawing the pollinia together; or the retinacula may be the active agents. Again, the pollinia themselves may swing upon the retinacular extremities, into which they are sometimes set as in a cup. Doubtless in many cases all three elements of the translator take part in varying degree. In the large-flowered species, details of construction are readily made out with the hand-lens; in the small-flowered species a magnification of fifty diameters becomes necessary.

ASCLEPIAS FALLAX Schlechter. No. 1352. Erect habit. Flowers erect. Cuculli large, ivory-white in colour; they give the character to the flower. Odour disagreeable and suggestive of valerian. *Translator mechanism*: Corpusculum moderately large. Retinacula short, stout, and thickened at either extremity. Pollinia of fly-wing type. Stigmatic slits very narrow. Angle salient.

A. LINEOLATA Schlechter. No. 1353. *Translator*: Corpusculum large. Retinacula short and stout. Pollinia of fly-wing type, one side having a concave outline. Proximal end of pollinium enclosed in a socket-like dilatation of retinaculum. Stigmatic valves horny; slit narrow, sides recoiling elastically after being opened. Angle salient; in profile the outline of the valves resembles that of the ram of a man-of-war.

Schizoglossum biflorum Schlechter var. guelense N. E. Br. No. 1354. *Translator*: Corpusculum relatively very large. Retinacula very short. Pollinia small, sausage-shaped, and somewhat flattened. Valves of stigmatic slit present a round, gaping mouth at the angle.

Periglossum mossambicense Schlechter (ex ic. et descript.). No. 1355. Anther-tips glistening white, completely roofing-in the column; pollinia ascending. *Translator*: Corpusculum minute. Retinacula very long, doubly curved, and horn-like, the pointed extremity attached to the corpusculum, the broad end to the sausage-shaped pollinium. Stigmatic slits turgid, gaping slightly, but rather more widely, below. No angle.

Pachycarpus concolor E. Mey. No. 1356. Corpusculum somewhat large. Retinacula short, stout, and curved. Pollinia flattened, with incurved edges, oval in their general outline. Stigmatic valves horny, the angle very prominent, each valve diverging from its fellow in its retreat back to the column, so as to leave a lens-shaped orifice below. Edges of valves charged with fine teeth directed inwards and upwards.

Note.—A specimen was found in which two pollinia were lodged at the upper end of the stigmatic chamber. Their substance was merged into that of the loose cellular tissue of the upper part of the column. Strands of tissue (germinating pollen-tubes, doubtless) were to be seen passing between the pollinia and the points where the two independent carpels blend with the columnar head.

Asclepias glaucophylla Schlechter. No. 1357. Corpusculum large. Retinacula short. Pollinia of fly-wing type. Stigmatic slits narrow, faintly dilated at the angle. Horizontal section of the valves and column shows a dilated chamber immediately behind the valves, which contracts axially into a narrow portion which penetrates deeply into the column.

Xysmalobium Cecilæ N. E. Br. No. 1358. Corpusculum of medium size. Retinacula stout, passing first horizontally outwards in a curve, whose convexity is below. At the end of the horizontal portion they arch backwards and then downwards to the dependent pollinia. Pollinia flattened, curved upon the flat, long in proportion to their breadth. Stigmatic valves horny, forming a gaping mouth below, where they retreat back to the column. Angle not markedly prominent. Transverse section shows thickening of the edges of the valves, but no teeth. Stigmatic chamber dilated behind the valves, narrowing as it approaches the axis of the column.

Schizoglossum aciculare N. E. Br. No. 1359. Corpusculum small. Retinacula short, stout, flattened and twisted. Pollinia relatively large, flattened, and of fly-wing type. Stigmatic slits narrow, diverging below.

Margaretta Whytei K. Schum. No. 1360. Flowers sometimes a pure blue, at others a purplish blue. Corolla in two

whorls. Summit of column forms a dome thatched by the scaly anther-tips. Corpusculum relatively large, exceeding one of the pollinia in size. Retinacula very short. Pollinia of long oval outline, flattened, and narrowing towards their attachment. These flowers are visited by butterflies, but whether they are the agents of fertilization or not remains to be determined.

Schizoglossum Carsoni N. E. Br. No. 1361. The retinacula here stand out at right angles to the corpusculum, the pollinia depending from the ends of the horizontal arms. The complete *translator* mechanism resembles a pair of scales. On withdrawal from their thecæ, the pollinia alone draw near to each other, the corpusculum and retinacula not appearing to take part.

[The determinations in this portion of the paper have been made by Mr. Spencer Moore, who has also described a new species of *Vangueria*.]

(To be continued.)

NOTES ON NOTTINGHAMSHIRE BOTANY.

By J. W. Carr, M.A., F.L.S., F.G.S.

Most of our knowledge of the Flora of Nottinghamshire is derived from the writings of Deering,* Ordoyno,† Jowett,‡ and Howitt,§ which cover a period of a hundred years from 1738 to 1839. Howitt's *Flora* records eight hundred and sixty-six species of phanerogams and vascular cryptogams, but includes a number of obvious introductions and plants of doubtful occurrence; these are ignored or queried in Watson's *Topographical Botany*, in which very few additional species are recorded.

During the last twenty years many plants unknown to, or not distinguished by, the earlier Notts botanists have been found, and in the *Victoria History of the County of Nottingham* there is a complete list of all species recorded for, or known to occur in, the county up to 1904.

The following list comprises all the species of vascular plants not contained in *Topographical Botany*, or in one or other of the county Floras, and may therefore be regarded as an attempt to bring the Notts list up to date. Mere varieties, casuals, and recently introduced species are ignored. All new county records,

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* Deering, Charles, *Catalogus Stirpium, &c.*, Nottingham, 1738.

† Ordoyno, Thos, *Flora Nottinghamiensis*, Newark, 1807.

‡ Jowett, Thos., *Botanical Calendar for Nottinghamshire.* A series of twenty-eight articles on the plants of the county, arranged according to the order of their appearance, published in the *Nottingham Journal* for 1826 under the pseudonym of "Il Rosajo." Several sets of these *Calendars* were neatly cut out of the *Journal*, mounted on thick white paper, and bound up with a specially-printed title-page. One of these—a beautifully-bound volume, with "Thos. Jowett" in his own handwriting on the title-page—is in my possession. The Nottingham University College, Mechanics' Institute, and Bromley House Libraries each possess a copy, but I know of no others.

§ Howitt, Godfrey, *The Nottinghamshire Flora*, London and Nottingham, 1839.

unless otherwise stated, have passed through the hands of Mr. Arthur Bennett, to whom I am greatly indebted for much kindly assistance.

Ranunculus circinatus Sibth. Frequent in canals.—*R. fluitans* Lam. Frequent in the Trent and other rivers.—*R. trichophyllus* Chaix. Nether Langwith (*teste* W. R. Linton).—*R. Drouetii* F. Schultz. Ponds at Warsop ("passing into *Godronii*" A. Bennett), and Kirkby; stream at Bingham.—*R. heterophyllus* Weber. Ponds, frequent.—*R. peltatus* Schrank. Ponds, Sherwood Forest, &c.—*R. Lenormandi* F. Schultz. Pond, Warsop; stream at Rufford Abbey.—*R. Lingua* Linn. Queried in *Top. Bot.*, but there is a specimen in the Lincoln Museum from "dykes in Misson parish, Notts.," collected by Rev. Thos. Owston about 1840.

[*Eranthis hyemalis* Salisb. Abundant and perfectly naturalised for many years past in a wood at Langar.]

Aquilegia vulgaris L. Queried in *Top. Bot.*, but occurs in a truly indigenous state in the High Park Woods, Greasley, in woods at Skegby and Shireoaks, and at Teversall—all on the Magnesian Limestone.

Papaver Lecoqii Lamotte. Lowdham, &c.

Corydalis claviculata DC. Barrow Hill Wood near Scaftworth, 1903; seen in this locality by Miss S. A. Miller about 1840.

Cardamine flexuosa With. Common in damp shady places. Not distinguished from *C. hirsuta* by the earlier Notts botanists. *C. hirsuta* also occurs, but is less common with us than *C. flexuosa*.

Erysimum cheiranthoides L. In several localities in the Trent and Idle Valleys, probably not indigenous.

[*Lepidium Draba* L. Abundant near the Water Mill at Ordsall, and in several places in the Trent Vale.]

Viola permixta Jord. Foss Road, Widmerpool and Clipstone; abundant in one or two spots.—*V. sylvestris* Kit. Woods and hedgebanks on the Magnesian Limestone and Keuper Marl, rather rare.—*V. Riviniana* Reichb. Very common.—*V. canina* L. (*ericetorum* Schrad.). Heaths and woods on the Bunter Sandstone. The *V. canina* of Howitt and earlier writers included this and the two preceding species.—*V. stagnina* Kit. Between Misson and Misterton; Rev. T. Owston, *c.* 1840. Specimen in Lincoln Mus. Herb., verified by Mr. W. H. Beeby.

Polygala vulgaris L. (the *eu-vulgaris* of Syme); *P. oxyptera* Reichb.; *P. serpyllacea* Weihe—all of frequent occurrence.

Stellaria neglecta Weihe. (*S. umbrosa* Opiz.). Papplewick, Linby, Clifton, Kirkby, &c.

Arenaria leptoclados Guss. Owthorpe.

Spergula arvensis L. Both forms—*S. vulgaris* (Boenn.) and *S. sativa* (Boenn.) occur.

Geranium pyrenaicum Burm. fil. Orston and Winthorpe, possibly introduced.

Ulex Gallii Planch. Bulwell and Sherwood Forests.—*U. minor* Roth. Sherwood Forest in several places.

[*Melilotus altissima* Thuill. Established in many places.]

Lathyrus Nissolia L. Queried in *Top. Bot.*, but there is a

specimen in Herb. Yorks. Phil. Soc. labelled "Newark, 1820. Mr. Middleton," and the Rev. H. P. Reader also possesses a Notts example. These remove all doubt as to its former occurrence.

Rubus. The following species, all identified by the Rev. W. Moyle Rogers, have been collected by Mr. H. Fisher or myself in Notts:—*R. suberectus* Anders., *R. incurvatus* Bab., *R. Lindleianus* Lees, *R. argenteus* Wh. & N., *R. rhamnifolius* Wh. & N., *R. pulcherrimus* Neum., *R. Selmeri* Lindeb., *R. rhombifolius* Weihe, *R. gratus* Focke, *R. thyrsoideus* Wimm., *R. rusticanus* Merc., *R. pubescens* Weihe, *R. macrophyllus* Wh. & N., sub-sp. *Schlechtendalii* (Weihe), *R. leucostachys* Sm., *R. anglosaxonicus* Gelert, *R. radula* Weihe, *R. echinatus* Lindl., *R. Koehleri* Wh. & N., subsp. *dasyphyllus* Rogers, *R. dumetorum* Wh. & N., with the vars. *rubriflorus* Purch. and *concinnus* Baker (the vars. *teste* W. R. Linton), *R. corylifolius* Sm. and var. *cyclophyllus* Lindeb.

Agrimonia odorata Mill. Farnsfield.

Rosa involuta Sm., var. *Sabini* (Woods). Bunny Hill.

Cratægus Oxyacantha (oxyacanthoides Thuill.). Not uncommon.—*C. monogyna* Jacq. Abundant.

Myriophyllum spicatum L. (segregate). Common.—*M. alternifolium* DC. Newark (H. Fisher).

Callitriche stagnalis Scop. Frequent.—*C. obtusangula* Le Gall. Wilford, Bingham.—*C. truncata* Guss. In the Rainworth Water below Inkersall, Rufford Forest, Aug. 1892, coll. H. Fisher. This interesting addition to the Notts flora lay in the herbarium at University College, labelled *C. hamulata*. Feeling that this naming required verification I sent the sheet to Mr. A. Bennett, who at once recognised the plant as *C. truncata*. In August, 1906, I found it in the Chesterfield Canal at Misterton, in the north of the county, fruiting abundantly; Mr. Fisher's specimens are barren.

Epilobium angustifolium L. A common plant in Notts at the present time, so much so that it seems hardly possible that it could have been entirely absent in 1839, when the last of the local "Floras" was published, especially as it has long been known to occur in all the surrounding counties—in Derbyshire since 1789, and in W. Yorks as far back as 1597. This species, however, possesses, in its very numerous small bearded seeds, almost unrivalled powers of spreading, and may thus easily become established and common in a locality where a few years previously it was unknown.—*E. tetragonum* Curt. (*adnatum* Griseb.). By the Rainworth Water in Rufford Forest, 1892, coll. H. Fisher.—*E. obscurum* Schreb. Frequent.

Selinum Carvifolia L. Marshy meadows in the parish of Teversall, near Mansfield, Aug. 1908. (See *Journ. Bot.* 1909, 71.)

Valeriana Mikanii Syme. Halloughton Wood.

Aster Tripolium L. Abundant and very fine by the side of the "Warping Drain" in the parish of Misson, in the extreme north of the county.

Arctium majus Bernh. and *A. minus* Bernh. Frequent.

Arnoseris pusilla Gaertn. Barrow Hills, Everton, in abundance, Sept. 1903.

Crepis biennis L. Hockerton and elsewhere, probably introduced: the early published records were almost certainly errors.

Hieracium vulgatum Fr. Frequent.—*H. sciaphilum* Uechtr. Frequent.—*H. tridentatum* Fr. Rufford Forest (Fisher). Fiskerton (these three species certified by Revs. E. F. and W. R. Linton).

Hypochæris glabra L. Queried in *Top. Bot.*, but grows about Newark, Wigsley, and on the Barrow Hills, Everton, and is undoubtedly indigenous.

Sonchus asper Hill. An abundant weed with us, but not recorded for Notts in *Top. Bot.*, nor in any of the local Floras; the earlier writers included it under *S. oleraceus*.

Legousia hybrida Delarbre. Cornfields on the Lias, West Leake, Kilvington, and Owthorpe.

Gentiana baltica Murb. Annesley, on the Magnesian Limestone.

Myosotis cespitosa Schultz. Frequent.—*M. repens* Don. Queried in *Top. Bot.*, but occurs in several places.

Cuscuta Trifolii Bab. On clover at Hayton, and on lucerne at Kingston, both in 1905. Doubtless introduced with the seed of the crop on which it was growing.

Mimulus Langsdorffii Donn. This handsome and showy American plant is firmly established and common in many places in North Notts, *e.g.* by the River Maun near Ollerton and Haughton, by the River Meden at West Drayton, about the old mill-pond at Cuckney, and by the lakes at Rainworth and Creswell Crags.

Veronica Tournefortii C. Gmel. Generally distributed and abundant on arable land, apparently unknown to Howitt and earlier Notts botanists.—*V. triphyllos* L. There is a specimen of this species in the herbarium at the Nottingham Natural History Museum which was gathered at the Barrow Hills, near Everton. No date or collector's name are given on the label, but the specimen is probably at least fifty or sixty years old. No other record exists.

Euphrasia. The "species" of this genus have not been fully worked out yet, but *E. brevipila*, *E. Kerneri*, and *E. nemorosa* certainly occur.

Melampyrum cristatum L. Wood near Retford, 1905. This very interesting addition to our flora was first found some years ago by the Rev. J. Roffey of Worksop, and again by Mr. E. Lidster of Retford, who kindly conducted me to the locality. Its discovery here considerably extends its northern range.—*M. pratense* L. Common in several woods on the eastern side of the county, and less common in Sherwood Forest. This is not a new county record, as the plant was known to all the early Notts botanists, but was omitted—no doubt accidentally—from Howitt's *Flora*, and therefore does not appear in *Top. Bot.*, the Notts list in that work having been compiled from Howitt.

Orobanche minor Sm. Coddington and Hawton (H. Fisher).

Mentha alopecuroides Hull. Clipstone, Sherwood Forest, probably not native.

Marrubium vulgare L. Omitted from *Top. Bot.*, but recorded by all the earlier Notts writers.

Lamium hybridum Vill. Not in *Top. Bot.*, although recorded by Howitt: I have seen it in quantity near Retford and near Tuxford.

Chenopodium hybridum L., and *C. urbicum* L. occur about Newark (Fisher), but are probably aliens. *C. urbicum* var. *intermedium* Moq. grows commonly near Kingston-upon-Soar.

Atriplex erecta Huds., *A. hastata* Huds. (*A. Smithii* Syme), and *A. deltoidea* Bab. all occur more or less frequently.

Polygonum mite Schrank. Osier-holt by the Trent, Wilford; by the Trent at Beeston.

Rumex limosus Thuill. By the "Warping Drain," Misson, 1905.

Euphorbia platyphyllos L. Cornfield on Lias, West Leake.

Betula "alba." Both *verrucosa* Ehrh., and *tomentosa* Reith. and Abel, occur.

Quercus Robur L. The var. *pedunculata* is the prevailing form, but *sessiliflora* is not uncommon.

Salix undulata Ehrh. (*alba* × *triandra*). Trent-side, Wilford, *teste* E. F. Linton.

Elodea canadensis Michx. Everywhere common.

Orchis ustulata L. Queried in *Top. Bot.*, but there is a fine sheet of this species in Jowett's *Herbarium Nottinghamiense* (1822) preserved in the Bromley House Library, Nottingham, collected "in limestone ground at Bulwell." The species is probably now extinct in Notts, but its former occurrence in the county is indisputably proved by these specimens.—*O. incarnata* L. Rather frequent in marshy places. Probably the *O. latifolia* of Jowett, Howitt, and other Notts botanists was really this species. I have not yet seen *O. latifolia* L. in Notts.

Habenaria virescens Druce. In woods throughout the Keuper Marl area. This is the *H. bifolia* of the early Notts botanists, but true *bifolia* has not been seen in Notts so far as I am aware.

Narcissus Pseudo-Narcissus L. Queried in *Top. Bot.*, but the true wild form is abundant in a wood at Marnham, near Tuxford.

Polygonatum multiflorum All. Pleasley Vale, Notts side. Howitt's locality—the only previous record—is, as he himself states, over the border in Derbyshire.

Juncus compressus Jacq. Sookholme Moor; old quarry in Magnesian Limestone, Warsop ("very like var. *coarctatus*" A. Bennett).

Potamogeton coloratus Hornem. Abundant in pools in old Magnesian Limestone quarry near Worksop, Aug. 1905.—*P. falcatus* Fryer. Drain at Misson, Aug. 1905.—*P. lucens* L. var. *acuminatus* Fr. R. Soar, Kingston.—*P. prælongus* Wulf. Beeston Canal, Lenton; R. Soar, Ratcliffe.—*P. Cooperi* Fryer. Grantham Canal, Gamston.

Scirpus fluitans L. Dyke in Misson parish.—*S. Tabernæmontani* Gmel. Nether Langwith, &c.—*S. maritimus* L. Misson, in "Warping Drain" in quantity, Aug. 1905.

Carex curta Good. Pond at Lindhurst, near Blidworth, July, 1905.—*C. binervis* Sm. Langford Moor and near Barnby (Fisher).—*C. distans* L. Teversall, with *Selinum Carvifolia* in fair quantity ("requires confirmation," *Top. Bot.*).—*C. fulva* Host. Teversall; Sookholme Moor; Warsop.

Alopecurus hybridus Wimm. (*geniculatus* × *pratensis*). By the R. Soar, Kingston, July, 1906. Pointed out to me by Mr. A. Bruce Jackson.

Agrostis gigantea Roth. (*A. alba* L. var. *gigantea* Meyer). Arnold (F. M. Robinson, 1906).—*A. nigra* With. Frequent about Nottingham.

Apera Spica-venti Beauv. Barrow Hills, Everton, 1903; cornfield between Ordsall and Eaton Wood, near Retford, July, 1906. The only previous record was that of Ray:—"Anno 1670 I observed it among the corn in the sandy grounds about Nottingham, &c., plentifully." (*Cat. Pl. Angl.* ed. 2, 136.)

Glyceria plicata Fr. Near Nottingham and Newark, West Leake, &c.

Festuca rubra L. Frequent.

Bromus erectus Huds. Linby, 1894; Oxton Hill; Wallingwells.

Equisetum maximum Lam. High Park Woods, Greasley, 1905; Teversall, Laxton.

[The following account of Thomas Jowett is taken from the article on the botany of the county by Mr. Carr, published in the *Victoria History of Nottinghamshire*. We have appended to it a copy of a letter addressed by Jowett to Robert Brown, which contains some information as to Deering. In the Report and Transactions of the Nottingham Naturalists' Society for 1906–7, pp. 59–72, Mr. Carr gives a full account of Jowett's herbarium.

"Thomas Jowett received a medical education, and practised in Nottingham for about ten years. In 1831 his health broke down, and he retired to the village of Morton in the Trent Vale, where he died in the following year at the early age of 31. From boyhood Jowett seems to have been keenly interested in the plants of his native county, and in 1826, when only 25 years old, he published in the *Nottingham Journal* under the pseudonym of 'Il Rosajo,' a series of 'Botanical Calendars,' or Notices of Native Plants of the County of Nottingham, arranged according to the order of their appearance. These Calendars, 28 in number, appeared at frequent intervals from March to September, and are as remarkable for their admirable literary style as for the evidence they afford of their author's intimate acquaintance with the county flora and with the botanical and poetical literature of his time. Localities are given for 1023 species of flowering plants and cryptogams, including more than 100 species not mentioned in the works of Deering and Ordoyno. Four volumes of dried specimens of Nottinghamshire plants collected and mounted by Jowett are preserved in the Bromley House Library at Nottingham. These are particularly valuable as settling the identity of several species which are not now to be found in the county."—(J. W. Carr in *Vict. Hist. Nottinghamshire*.)

"I have the pleasure of sending you some flowers of *Antirrhinum Linaria* approaching to *Peloria*. I have sent all I met with, and in their different stages of growth. The perusal of Mirbel's 'Elémens de Physiologie Végétale' which you recom-

mended has afforded me much gratification; could I indulge my inclinations I should study it closely, but at present I feel it necessary to devote my attention to the acquirement of that knowledge by which I hope to facilitate my progress through life. I lately saw a part of Dr. Deering's manuscripts; from his interleaved copy of the 'Catalogue of Plants growing about Nottingham' I obtained a few MS. additions; the present professor suggests that the Dr. added the 'occasional dedication' of which I wrote you a copy, because he received no encouragement from those whom he chose his first patrons; he was indeed an unfortunate and an irritable man; he died in poverty, and his grave is without a stone to indicate its tenant. With this I send a list of the Flora of our County as far as I know it to have been hitherto explored. I have not continued it further than the ferns, for with the exception of Deering I believe no botanist has investigated it further, and I have not yet had leisure to undertake the remainder of the cryptogamia myself. . . . ."—Letter from Thomas Jowett to R. Brown, Nottingham, Jan. 12, 1823.

Mr. Carr writes: "I long ago tried to clear up the mystery of Deering's Herbarium, without result. I wrote to Lord Middleton —the present descendant of the Willoughbys—who were patrons of Ray and Deering, and he invited me to Wollaston to see his Natural History specimens. I found *no* dried plants beyond various fruits and seeds and other odds and ends, but these were reputed to have belonged to Ray, and there was nothing whatever even traditionally ascribed to Deering. Probably his plants had long ago succumbed to the attacks of insects or mites, or been committed to the flames. The present head of the Howitt family does not know what became of Godfrey Howitt's Notts plants."]

FERDINAND BAUER'S DRAWINGS OF AUSTRALIAN PLANTS.

By James Britten, F.L.S.

The interest now shown in Australia in the work of the early contributors to the knowledge of its flora makes it desirable that the material existing in England should be rendered available for use by those who are at present engaged in the investigation of the history of Australian plants. In this Journal for 1907 (p. 70) I indicated what MSS. were preserved in the library attached to the National Herbarium, and promised to publish a list of the drawings of Australian plants by Ferdinand Bauer which form one of the treasures therein preserved; that promise I now proceed to fulfil.

The most complete biography of Ferdinand Bauer is that contributed by Dr. John Lhotsky, his fellow-countryman and fellow-traveller in Australia, to Hooker's *London Journal of Botany* (ii. 106–113) in 1843—an expansion of that published in Proc. Linn. Soc. i. 39, read at the meeting of the Society on June 18th, 1839.

From the former, which is not easily accessible, I extract such portions as are connected with Ferdinand's work on Australian plants :—

"So early as the year 1801, we find the merits of our friend fully acknowledged, and himself appointed Natural History Draughtsman to the expedition to Terra Australis, commanded by Captain Flinders, of 'H.M.S. Investigator.' I am enabled, from letters in my possession, to state what were the liberal terms granted to Bauer. His salary was £300 a year, with rations for himself and servant. The E. I. Company having contributed £1200 towards the expenses of this expedition, the share which Bauer received enabled him to make his outfit as an artist very complete. It was farther granted by the Lords of the Admiralty that all drawings executed which were not required for publication in any work connected with the expedition should be the artist's own property, as well as the specimens collected by him, except those that should go to the British Museum. . . . During his excursions from False Bay to Table Mountain, and those at King George's Sound, until the first arrival of the 'Investigator' at Port Jackson, Bauer had completed, up to the 22nd of May, 1802, 350 sketches of plants, and 100 of animals, &c. On quitting the latter place for Torres' Straits, he writes on the 20th of July that his collection then comprised seven hundred drawings, which he had left for safety in the house of the Governor. . . . [In a letter] probably written in the middle of the year 1803, Bauer states, that between the period of his starting from and his return to Sydney, he had executed designs of 500 species of plants, and 90 of animals; the latter chiefly birds. He complains in this and former communications that the wet state of the cabins in the 'Investigator,' by injuring all his paper, had hindered the perfect execution of his drawings. Captain Flinders having decided to go back to England, Mr. Robert Brown and Mr. Bauer awaited his return in Australia; and during this period, Ferdinand visited Norfolk Island, and spent eight months there, collecting those materials from which Endlicher has been subsequently enabled to compile his *Flora Norfolkica*." In his preface to the *Prodromus Florœ Norfolkicæ* (1833)—the work intended—Endlicher says: "Quidquid ex hac opella in scientiam commodi redundare confido, Baueri in colligendis stirpibus industriae, in dessicando dexteritati et divino plane in pingendo ingenio debetur."

It would appear from a note in Konig and Sims's *Annals of Botany*, ii. 594 (1806), that it was in contemplation to publish the botanical drawings in a work for which Robert Brown was to supply the text: the passage runs :—

"We are happy to find that Mr. Brown and Mr. Ferd. Bauer are sedulously employed in arranging their important materials for a work which cannot fail to prove a lasting monument both to their indefatigable zeal and the talents by which they are so eminently distinguished; the former as one of the most philosophical and accurate botanists of the day, the latter as an artist whose performances (like those of his brother) unite, with a truth

hitherto unseen in botanical paintings, all the neatness, grace, and effect, so much admired in the works of a Mignon and Van Huysum. It is scarcely necessary to add that the work alluded to is the result of their botanical researches on the expedition of Captain Flinders to New Holland, of which we have had an opportunity to mention some particulars in the miscellaneous articles of the first volume of these Annals. The mode in which their publication will be offered to the public is unknown to us; we suppose, however, that it will be preceded by a prodromus by Mr. Brown, which will convey a better idea of the variety and singularity of his materials than we are able to give in this place."

The passage from the first volume, to which reference is made above, may be added here, as it gives the earliest estimate of Brown's collections; the information was supplied by Sir Joseph Banks, to whom, pending the return of Brown, the dried plants were entrusted by order of the Admiralty:—

"By letters received from Mr. Brown, it appears that so long ago as the latter end of May 1802, that excellent and indefatigable artist, Mr. Ferd. Bauer, had made 350 drawings of plants, bestowing at the same time infinite pains on the dissections of the parts of fructification: and that Mr. Brown had collected and described 750 species, exclusively of the class Cryptogamia, on the southern coast of New Holland. Of these about 120 had been observed in New South Wales; a few are natives also of New Zealand, and one or two are Linnean species: the rest are all new, mostly belonging to known genera, or to new ones in the natural families most frequent in the vicinity of the colony" (p. 394).

The arranged collection, numbering 236, of Ferdinand Bauer's Australian drawings in the Department of Botany contains those received from the Admiralty in 1843 and those bequeathed by Robert Brown. The former series numbered 203, the latter 49, of which 16 were duplicates of those in the Admiralty series. Brown's series formed one of two volumes bequeathed by Ferdinand to his brother Francis, from whom Brown obtained them by purchase; the other, containing 40 paintings of animals as beautiful as those of the plants, is in the Zoological Department of the Museum. Lhotsky's allusion to them as "two volumes of *miniature* paintings" must be taken as referring to their careful finish and not to their size. We have no specimens of the plants collected by Bauer.

There is also, as is well known, a collection of Ferdinand Bauer's drawings at the Naturhistorischen Hofmuseum, Vienna, as to which Dr. Zahlbruckner has kindly given me the following particulars:—"The botanical department has several large fascicles of drawings by Ferd. Bauer, partly complete, partly only sketches. We have no coloured drawings. The drawings in our possession relate partly to Endlicher's *Iconographia*, partly to plants from Australia and the Cape of Good Hope. As regards the drawings for Endlicher's *Iconographia*, these are all present, so far as I see, from proofs. We have also drawings of species which were prepared for this work but not published."

List of Drawings.

1. Hibbertia dealbata Benth.
2. Pachynema complanatum Br.
3. Brasenia peltata Pursh
4. Cochlospermum Gillivræi Benth.
5. Citriobatus pauciflorus A. Cunn.
6. Pronaya elegans Hueg.
7. Tremandra stelligera Br.
8. Polycarpæa synandra F. Muell. var. gracilis
9. Calandrinia calyptrata Hook. f.
10. Howittia trilocularis F. Muell.
11. Hibiscus rhodopetalus F. Muell.
12. Fugosia hakeæfolia Hook.
13. } Sterculia ramiflora Benth.
14. }
15. Rulingia hermanniæfolia Steetz
16. Keraudrenia Hookeriana Walp.
17. Tribulus pentandrus Benth.
18. Nitraria Schoberi Br.
19. Micromelum pubescens Bl.
20. Harrisonia Brownii A. Juss.
21. Turræa Brownii C. DC.
22. Cedrela Toona Roxb.
23. Flindersia australis Br.
24. Stackhousia viminea Sm.
25. S. Brunonis Benth.
26. Cryptandra ericifolia Rudge
27. Dodonæa humilis Endl.
28. Distichostemon phyllopterus F. Muell.
29. Spondias Solandri Benth.
30. Bossiæa dentata Benth.
31. Templetonia Hookeri Benth.
32. Hovea longifolia Br.
33. H. longipes Benth.
34. Crotalaria trifoliastrum Willd.
35. Æschynomene falcata DC.
36. Eriosema chinense Vog.
37. Cassia phyllodinea Br.
38. Acacia alata Br.
39. Callicoma serratifolia Andr.
40. Aphanopetalum resinosum Endl.
41. } Cephalotus follicularis
42. } Labill.
43. Drosera pygmæa DC.
44. D. petiolaris Br.
45. D. binata Labill.
46. Byblis liniflora Salisb.
47. Lumnitzera racemosa Willd.
48. Actinodium Cunninghamii Schau.
49. Darwinia taxifolia A. Cunn.
50. D. diosmoides Benth.
51. Verticordia Brownii DC.
52. Agonis marginata Schau.
53. Kunzea Baxteri Schau.
54. Calothamnus gracilis Br.
55. Eucalyptus Lehmanni Schau.
56. E. ferruginea Schau.
57. E. setosa Schau.
58. Osbornia octodonta F. Muell.
59. Fenzlia obtusa Endl.
60. Modecca australis Br.
61. Trachymene incisa Rudge
62. Siebera juncea Br. var. pendula
63. Xanthosia pilosa Rudge
64. X. rotundifolia DC.
65. Astrotricha longifolia Benth.
66. } Mackinlaya macrosciadia
67. } F. Muell.
68. Sambucus Gaudichaudiana DC.
69. Gardenia megasperma F. Muell.
70. Scyphiphora hydrophylacea Gaertn.
71. Timonius Rumphii DC.
72. Canthium attenuatum Br.
73. Psychotria nesophila F. Muell.
74. Centratherum muticum Lees
75. Calotis dentex Br.
76. C. lappulacea Benth.
77. Monenteles glandulosus F. Muell.
78. Ammobium alatum Br.
79. Leptorhynchus elongatus DC. var. peduncularis
80. Helichrysum scorpioides Labill.?
81. Cymbonotus Lawsonianus Gaud.
82. Stylidium scandens Br.
83. S. fasciculatum Br.
84. Leschenaultia formosa Br.
85. L. filiformis Br.
86. Velleia trinervis Labill.
87. Calogyne pilosa Br.
88. Scævola spinescens Br.
89. Diaspasis filifolia Br.
90. Dampiera Brownii F. Muell.
91. Brunonia australis Sm.
92. Lysinema ciliatum Br.
93. Cosmelia rubra Br.
94. Sprengelia Ponceletia F. Muell.
95. Andersonia sprengelioides Br.
96. A. cærulea Br.

97. Dracophyllum secundum Br.
98. Ægialitis annulata Br.
99. Alyxia spicata Br.
100. Lyonsia straminea Br. (L. reticulata F. Muell.)
101. Wrightia pubescens Br.
102. Gymnanthera nitida Br.
103. Cynanchum floribundum Br.
104. Sarcostemma australe Br.
105. Microstemma tuberosum Br.
106. Logania pusilla Br.
107. Solanum Hystrix Br.
108. Duboisia myoporoides Br.
109. Anthocercis viscosa Br.
110. Buchnera gracilis Br.
111. Nelsonia campestris Br.
112. Pholidia scoparia Br.
113. Eremophila Brownii F. Muell.
114. Chloanthes stœchadis Br.
115. Pityrodia salvifolia Br.
116. Prostanthera prunelloides Br.
117. Hemigenia purpurea Br.
118. Deeringia celosioides Br.
119. Ptilotus conicus Br.
120. Trichinium gracile Br.
121. Enchylæna tomentosa Br.
122. Threlkeldia diffusa Br.
123. Gyrostemon ramulosus Desf.
124. Myristica insipida Br.
125. Stirlingia tenuifolia Endl.
126. Synaphea dilatata Br.
127. Conospermum ericæfolium Sm.
128. Franklandia fucifolia Br.
129. Symphionema paludosum Br.
130. Grevillea concinna Br.
131. G. chrysodendrum Br.
132. G. Banksii Br.
133. G. pauciflora Br.
134. G. heliosperma Br.
135. G. refracta Br.
136. G. pulchella Meissn.
137. Hakea lorea Br.
138. Banksia pulchella Br.
139. B. coccinea Br.
140. B. speciosa Br.
141. B. ilicifolia Br.
142. Dryandra floribunda Br.
143. D. formosa Br.
144. Nuytsia floribunda Br.
145. Loranthus celastroides Sieb.
146. L. longiflorus Desr. (Benth.)
147. Santalum ovatum Br.
148. Leptomeria acida Br.
149. Poranthera corymbosa Brongn.
150. Monotaxis linifolia Brongn.
151. Amperea spartioides Brongn.
152. Petalostigma quadriloculare F. Muell.
153. Hemicyclia australasica Muell. Arg.
154. Antiaris macrophylla Br.
155. Laportea gigas Wedd.
156. Casuarina torulosa Ait.
157, 158. Cycas media Br.
159, 160. C. angulata Br.
161. Ottelia ovalifolia L. C. Rich.
162. Dendrobium undulatum Br.
163. Cymbidium suave Br.
164. Dipodium punctatum Br.
165. Spiranthes australis Lindl.
166. Thelymitra ixioides Sw.
167. T. canaliculata Br.
168. T. media Sw.
169. T. tigrina Br.
170. T. carnea Br.
171. T. fusco-lutea Br.
172. T. venosa Br.
173. Epiblema grandiflorum Br.
174. Diuris alba Br.
175. D. punctata Sm.
176. D. aurea Sm.
177. D. maculata Sm.
178. D. pedunculata Br.
179. D. sulphurea Br.
180. D. pauciflora Br.
181. Cryptostylis longifolia Br.
182. C. ovata Br.
183. C. erecta Br.
184. Prasophyllum striatum Br.
185. P. rufum Br.
186. Corysanthes unguiculata Br.
187. C. fimbriata Br.
188. C. bicalcarata Br.
189. Pterostylis nutans Br.
190. P. gibbosa Br.
191. Caleana major Br.
192. Acianthus caudatus Br.
193. A. fornicatus Br.
194. A. exsertus Br.
195. Eriochilus autumnalis Br.
196. Lyperanthus nigricans Br.
197. Cyrtostylis reniformis Br.
198. Caladenia suaveolens Reich.
199. C. testacea Br.
200. Glossodia major Br.
201. G. minor Br.
202. Chiloglottis diphylla Br.
203. Calochilus campestris Br.
204. C. paludosus Br.
205. Gastrodia sesamoides Br.
206. Habenaria elongata Br.
207. H. ochroleuca Br.
208. Hæmodorum planifolium Br.

209. Conostylis aculeata Br.
210. Patersonia sericea Br.
211. Eustrephus latifolius Br.
212. Thysanotus volubilis Br.
213. Tricoryne scabra Br.
214. Laxmannia gracilis Br.
215. Burchardia umbellata Br.
216. Anguillaria dioica Br.
217. Xerotes hastilis Br.
218. Dasypogon bromeliifolius Br.
219, 220. Kingia australis Br.
221. Calectasia cyanea Br.
222–224. Ptychosperma elegans Blum.
225–227. Livistona humilis Br.
228. Gymnostachys anceps Br.
229. Azolla pinnata Br.
230. Aseroë rubra Labill.
231. } Agaricus (Lepiota) rhacodes
232. } Quel.
233. Agaricus (Clitocybe) laccatus Scop.
234. Undetermined Agaric.
235. Hygrophorus miniatus Fr. and Lepiota sp.
236. Clavaria rosea Fr.? and Leptoglossum viride Pers.

A large number of these drawings are the originals of plates published in various works; of these the following is a list, to which I have added an enumeration of the drawings used with an indication of the place of publication of each:—

Ferdinand Bauer's *Illustrationes Floræ Novæ Hollandiæ* (1813) (15 plates), tt. 3, 4, 8–11.

Flinders's *Voyage to Terra Australis* (1814), Atlas (10 plates), tt. 1, 4–10.

Endlicher's *Atakta* (1833) (38 plates) (t. 2 never published, *fide* Pritzel), tt. 17, 30, 31.

Endlicher's *Iconographia* (1838) (125 plates), tt. 1, 3–8, 16–18, 23, 31, 32–38, 41, 52, 58, 60–62, 64, 66, 68, 74, 77, 79, 92, 96, 97, 114, 115.

Martius's *Historia Naturalis Palmarum*, tt. 105, 106, 109–111. The reproductions in this work do scant justice to the originals.

Trans. Linnean Society, x. tt. 3, 29.

23. *Flindersia australis* Br. Original of t. 1, Atlas to Flinders's *Voyage to Terra Australis* (1814).
27. *Dodonæa humilis* Endl. t. 31, Endlicher's *Atakta* (1833).
28. *Distichostemon phyllopterus* F. Muell. t. 30, *Atakta*.
40. *Aphanopetalum resinosum* Endl. t. 96, Endlicher's *Iconographia* (1838).
41, 42. *Cephalotus follicularis* Labill. t. 4, Flinders's *Voyage*.
46. *Byblis liniflora* Salisb. t. 113, *Iconographia*.
59. *Fenzlia obtusa* Endl. t. 17, *Atakta*.
60. *Modecea australis* Br. tt. 114, 115, *Atakta*.
91. *Brunonia australis* Sm. t. 10, Ferdinand Bauer's *Illustrationes Floræ Novæ Hollandiæ* (1813), and apparently of *Trans. Linn. Soc.* x. t. 29.
104. *Sarcostemma australe* Br. t. 64, *Iconographia*.
105. *Microstemma tuberosum* Br. t. 60, *Iconographia*.
106. *Logania pusilla* Br. t. 58, *Iconographia*.
108. *Duboisia myoroporoides* Br. t. 77, *Iconographia*.
109. *Anthocercis viscosa* Br. t. 68, *Iconographia*.
111. *Nelsonia campestris* Br. t. 79, *Iconographia*.
112. *Pholidia scoparia* Br. t. 66, *Iconographia*.
113. *Eremophila Brownii* F. Muell. t. 92, *Iconographia*.

114. *Chloanthes stæchadis* Br. t. 4, *Illustrationes.*
118. *Deeringia celosioides* Br. t. 62, *Iconographia.*
125. *Stirlingia tenuifolia* Endl. t. 23, *Iconographia.*
126. *Synaphea dilatata* Br. t. 7, Flinders's *Voyage*, and t. 32, *Iconographia.*
127. *Conospermum ericæfolium* Br. t. 31, *Iconographia.*
128. *Franklandia fucifolia* Br. t. 6, Flinders's *Voyage*, and t. 52, *Iconographia.*
132. *Grevillea Banksii* Br. t. 9, *Illustrationes.*
139. *Banksia coccinea* Br. t. 3, *Illustrationes.*
143. *Dryandra formosa* Br. *Trans. Linn. Soc.* x. t. 3 (1810).
148. *Leptomeria acida* Br. t. 74, *Iconographia.*
154. *Antiaris macrophylla* Br. t. 5, Flinders's *Voyage.*
181. *Cryptostylis longifolia* Br. t. 17, *Iconographia.*
186. *Corysanthes unguiculata* Br. t. 18, *Iconographia.*
187. *Corysanthes fimbriata* Br. t. 10 B, Flinders's *Voyage.*
191. *Caleana major* Br. t. 8, *Iconographia.*
193. *Acianthus fornicatus* Br. t. 16, *Iconographia.*
195. *Eriochilus autumnalis* Br. t. 6, *Iconographia.*
196. *Lyperanthus nigricans* Br. t. 7, *Iconographia.*
200. *Glossodia major* Br. t. 41, *Iconographia.*
202. *Chiloglottis diphylla* Br. t. 8, *Illustrationes.*
204. *Chilochilus paludosus* Br. t. 14, *Iconographia.*
205. *Gastrodia sesamoides* Br. t. 5, *Iconographia.*
211. *Eustrephus latifolius* Br. t. 4, *Iconographia.*
213. *Tricoryne scabra* Br. t. 11, *Illustrationes*, and t. 61, *Iconographia.*
214. *Laxmannia gracilis* Br. t. 97, *Iconographia.*
216. *Anguillaria dioica* Br. t. 3, *Iconographia.*
218. *Dasypogon bromeliæfolius* Br. t. 8, Flinders's *Voyage.*
221. *Calectasia cyanea* Br. t. 9, Flinders's *Voyage.*
222–224. *Ptychosperma elegans* Bl. tt. 105, 106, 109, Martius's *Historia Naturalis Palmarum.*
225, 227. *Livistonia humilis* Br. tt. 110, 111, *Hist. Nat. Palm.*
228. *Gymnostachys anceps* Br. t. 9, *Iconographia.*
229. *Azolla pinnata* Br. t. 10 A, Flinders's *Voyage.*
230. *Aseroë rubra* Labill. t. 1, *Iconographia.*

SHORT NOTES.

Campylopus brevipilus B. & S. c. fr.—*Campylopus brevipilus* B. & S. has only once been recorded in fruit, in August, 1895, when it was discovered by E. Jörgensen on the Island of Stord, on the west coast of Norway, and described, with a plate, by the finder (Bergens Museums Aarbog, 1894–95, No. xvii. p. 32). The fruit was then deoperculate, and the calyptra and lid were not found. In July, 1907, Mr. J. Hunter collected it in fruit, with numerous capsules, at Ballyliffin, Innishowen Peninsula, North Donegal, on peat. The fruiting plants are very slender, and the upper leaves and bracts subulate, with no hyaline points, so that the plant

might very readily be passed over for *C. pyriformis*. The calyptra is fringed at base, the lid conical, with a nearly straight or oblique subulate beak, fully two-thirds the length of the capsule. The characters of the capsule and peristome quite agree with the description and figures given by Jörgensen. As some of the capsules in Mr. Hunter's gathering were deoperculate, while others retained the lid and even the calyptra, it may be concluded that Jörgensen's suggestion is correct, that July is the time of maturing the fruit.—H. N. Dixon.

Haplomitrium Hookeri in Devon.—*Haplomitrium Hookeri* is so rarely found in this country that its particular habitats are worthy of note. So far as I am aware, *Haplomitrium* had not been recorded for Devon before August 15th, 1906, when I found it growing near boggy ground on the dip slope of Woodbury Common, about a mile behind Woodbury Castle, a little distance due north of Budleigh Salterton on the coast. I found seven or eight plants of both sexes. The plants grew on an old cart-track just where it dipped a little owing to its being crossed by a tiny water-channel. In December, 1906, I was able to detect *Haplomitrium* in the same spot. I have repeatedly visited the spot during 1907 and 1908, but have not found *Haplomitrium* since. *Fossombronia* was abundant there in 1906, but in 1908 very scarce. The rarer plants seem to have given place to commoner forms. The spot is only a few square yards in area, but the conditions obtaining there are never twice alike.—A. S. Horne.

Ranunculus Llaveanus Schlecht.—This species is described by Schlechtendal (*Linnæa*, x. 233) from a plant collected by Schiede in grassy places, Jalapa, Mexico, whence we have authentic specimens in the National Herbarium. It is a plant with deeply dissected leaves, resembling in this respect *R. delphinifolius* H. B. K. and *R. dichotomus* DC.; Mr. Hemsley (*Bot. Biolog. Centrali-Amer.* i. 7) suggests that it should be referred to the former of these, which it certainly closely resembles. Dr. Briquet (*Annuaire de Genève*, 1908, p. 178) refers to *R. Llaveanus* somewhat tentatively Pringle, No. 4133, from Michoacan, Mexico; but the type, although imperfect, is sufficient to show that Pringle's plant cannot be identical with this species.—E. G. Baker.

REVIEWS.

Ueber den Bau und die Entwicklung der Florideengattung Martensia. Von Nils Svedelius (K. Svensk. Vet. Akad. Handl. xliii. No. 7). 1908. 101 pp. Four plates and sixty-two figures.

The author, finding that the respective explanations afforded by Harvey and Agardh as to the origin of the reticulate zone of the thallus of *Martensia* were insufficient and at variance, has investigated the matter for himself. And, being the fortunate possessor of material preserved in formalin, he has been able to

ascertain some details which are incapable of being studied in herbarium material. Briefly stated the results are a description of the true mode of formation of the reticulum and of the development of the tetraspores, the spermatangia, and the cystocarp. (1) The *frond* is more or less flabellate in shape, and from an early stage it grows almost exclusively by means of a characteristic intercalary cell-division, which reaches its maximum in the formation of the reticulum. There are three types of this mode of growth exhibited respectively by the species *M. fragilis*, *M. pavonia*, and *M. flabelliformis*. (2) The *tetrasporangia* are borne on the lamellæ of the reticulum in most species, and are immersed. Their single rudiment-cells are multinucleate like the other cells of the plant; and, as the cell grows, these nuclei increase to perhaps fifty and then degenerate and disappear—all but one, which becoming situated in the middle of the dense cytoplasm undergoes division into four—the definitive nuclei of the tetraspores. (3) The *spermatangia* occur in one or more sori on special male plants and are borne only on the lamellæ. They develop out of superficial cells, which by repeated division are cut up into uninucleate mother-cells; and these mother-cells each abstrict off apically one or two uninucleate spermatangia. The author insists upon the importance of the different modes of development of the spermatangium-mother-cells, and of the methods by which the spermatangia are abstricted, as affording valuable characters for distinguishing various types of organization among the *Florideæ*; and he illustrates his point by a number of figures and a synoptic table. (4) The *cystocarps* are borne only along the edges of the lamellæ. The carpogonium is the apical cell of a special branch. All the cells of the carpogonial branch and carpogonium are multinucleate. After fertilization and the formation of the auxiliary cell, and the division of the latter into foot-cell and central-cell, the gonimoblast-threads arise from the central-cell and are usually all uninucleate. They produce the carpospores, which are also uninucleate.

We are greatly indebted to Herr Svedelius for this careful piece of work. It is one which appeals rather to the morphologist than to the systematist, inasmuch as it describes a genus of *Florideæ* which is characterized not only by its intercalary growth, but by its multinucleate cells. The plates and figures which illustrate the text are excellent, and the exposition of the subject is clearly rendered.

A. & E. S. Gepp.

A Monograph of the British Desmidiaceæ. By W. and G. S. West. Vol. iii. Pp. xv. and 274. Plates 65–95. London: Ray Society. 1908.

The third volume of Messrs. W. and G. S. West's monograph of British Desmids contains the description of one hundred and seventy-four species and numerous varieties of the genus *Cosmarium*, to which a considerable portion of the second volume had already been devoted; twenty-four species of the genus still

remain to be dealt with in the fourth volume. When complete, this exhaustive account of British *Cosmaria*, accompanied as it is by a wealth of illustration, will be one of the most valuable contributions to algal taxonomy published in the last decade. The two authors have spared no trouble in carefully estimating the specific value of the numerous forms of this difficult genus that have been—so often inadequately—described. The figures show the same high standard of excellence as in the two previous volumes, while the plates exhibit none of the overcrowding occasionally noticeable in the first two parts. The arrangement of the species is, as in the case of the *Cosmaria* described in vol. ii, based on external characters, and the authors state (p. 128) that they are "gradually arriving at the conviction that external form is the dominating factor in the determination of the species-groups in Desmids"; and that "this being the case, much of the suggested artificiality of the present arrangement of *Cosmaria* disappears." It is possible, however, that the characters of the zygospores, which are as yet unfortunately unknown in the large majority of the Desmids, may furnish a better basis for a natural grouping of the species, although in the actual determination of Desmid-material we must always depend largely on external characters.

F. E. F.

Notes of a Botanist on the Amazon and Andes, being Records of Travel on the Amazon and its Tributaries, the Trombetas, Rio Negro, Uaupés, Casiquiari, Pacimoni, Huallaga, and Pastasa; as also the Cataracts of the Orinoco; along the Eastern Side of the Andes of Peru and Ecuador, and the Shores of the Pacific, 1849–1864. By Richard Spruce, Ph.D., edited and condensed by Alfred Russel Wallace, O.M., F.R.S., with a Biographical Introduction, portrait, 71 illustrations and 7 maps. Two vols., cloth, 8vo, pp. lii. 518, xii. 542. Macmillan & Co. Price 21*s.* net.

Mr. Alfred Wallace has performed a labour of love by bringing together and carefully editing the notes of the travels of one of the most distinguished of plant-collectors in regions, up to his time botanically unknown, which he was the first to explore. A student of botany—and notably of the hepatics and mosses, with which his name will always be especially associated—from his early days Spruce had prepared himself for his more important work by English and Pyrenean travels and by papers giving the results of these researches; so that when, in his thirty-second year, he arrived in 1849 at Para, he was already fully qualified to extend his knowledge and continue his botanical work. How thoroughly he availed himself of his opportunities, his collections, phanerogamic and cryptogamic, and his numerous and important publications sufficiently testify.

Shortly after his arrival at Santarem, Spruce acquired the friendship of Mr. A. R. Wallace, whose younger brother had been his fellow-traveller—a friendship continued till his death, and

of which these volumes may be regarded as an outcome. From this forward it is easy to trace his career through his diary and through the admirable letters, full of information and observation, addressed to Bentham and others. Many of these were printed at the time in Hooker's *Journal of Botany* (1850–1855), but it was well worth while to bring them together in a collected and connected form.

As an example of his letters and of the interesting and suggestive material which they contain, we may take the following from one written to Bentham from Ambato in 1858:—

"I have lately been calculating the number of species that yet remain to be discovered in the great Amazonian forest, from the cataracts of the Orinoco to the mountains of Matto Grosso; taking the fact that by moving away a degree of latitude or longitude I found about half the plants different as a basis, and considering what very narrow strips have up to this day been actually explored, and that often very inadequately, by Humboldt, Martius, myself, and others, there should still remain some 50,000 or even 80,000 species undiscovered. To anyone but me and yourself this estimation will appear most extravagant, for even Martius (if I recollect rightly) emits an opinion that the forests of the Amazon contain but few species. But allowing even a greater repetition of species than I have ever encountered, there cannot remain less than at least half of the above number of species yet to be discovered.

"At the highest point I reached on the Uaupés, the Jaguaraté caxoiera, I spent about a fortnight, in the midst of heavy rains, when (according to my constant experience) very few forest trees open their flowers. But when the time came for my return to Panuré (for I had to give up the boat and Indians by a certain day) the weather cleared up, and as we shot down among the rocks which there obstruct the course of the river, on a sunny morning, I well recollect how the banks of the river had become clad with flowers, as it were by some sudden magic, and how I said to myself, as I scanned the lofty trees with wistful and disappointed eyes, 'There goes a new *Dipteryx*—there goes a new *Qualea*—there goes a new the Lord knows what!' until I could no longer bear the sight, and covering up my face with my hands, I resigned myself to the sorrowful reflection that I must leave all these fine things 'to waste their sweetness on the desert air.' From this point upwards one may safely assume that nearly everything was new, and I have no doubt that the tract of country lying eastward from Pasto and Popayan, where are the headwaters of the Tapimá Uaupés, and Guaviaré—probably nearly conterminous—offers as rich a field for a botanist as any in South America" (pp. 207, 208).

A chapter of special interest is that on "Ants as Modifiers of Plant-Structure," communicated to the Linnean Society in 1869, but not published. Subsequent investigations have shown that the views put forward by Spruce require modification, as indeed was indicated in the report of the Council of the Linnean Society

declining to publish the paper without alteration; but the observations on the plants *in situ* are valuable and interesting, and Mr. Wallace's remarks bring the position of this very curious subject up to date. It is to be regretted, however, that some names of species referred by Spruce to *Tococa* should now be printed for the first time; it would not have been difficult to correlate these with the names subsequently adopted and duly published. This criticism applies to many other names—*e. g.* several species of *Sipanea*—which have not hitherto been published. In vol. i. (p. 111) is a reference to "*Hydrocharella chætospora* gen. nov." The plant distributed under this name is referred in Gen. Pl. iii. 564 to *Limnobium*, but the name *chætospora* is erroneously transcribed *echinospora* and in that form it appears in the Kew *Index*.

The incidental references to those with whom he was more or less intimately associated are of interest. Thus of William Jameson (1796–1881) described (ii. 210) as "a tall ruddy Scot, [who] although on the shady side of sixty years may very well reach a hundred and fifty, for he shows no signs of age yet"—"one of the most amiable of men, an ardent collector" (p. 210)—we read that he had "a drunken (and worse) wife hanging on to him for forty years, who burns his dried plants whenever she can get hold of them, so that he can keep no herbarium, and has often had to struggle with absolute want." This, as Mr. Wallace says, explains why "a man with (apparently) such fine opportunities and who was so interested in botany, did so little."

If we seek for an estimate of the general results of Spruce's work, none better can be found than that appended by Bentham to a statement (printed but not published) of the results of his travels drawn up by Sir Clements Markham in 1864:—"His researches into the vegetation of the interior of South America have been the most important that we have had since the days of Humboldt: not merely for the number of species he has collected, amounting to upwards of 7000, but for the number of new generic forms with which he has enriched science; for his investigations into the economic uses of the plants of the countries he visited; for several doubtful questions of origin as to interesting genera and species which his discoveries have cleared up; and for the number and scientific value of his observations made on the spot, and attached to the specimens preserved; all which specimens have been transmitted to this country, and complete sets deposited in the national herbarium at Kew."

BOOK-NOTES, NEWS, &c.

We learn with much pleasure that Mr. N. E. Brown, who has been for so many years associated with the Kew Herbarium, has been appointed Assistant-Keeper thereof. This is a new post; Dr. Stapf has succeeded to the Keepership vacated by Mr. Hemsley's retirement, and Mr. C. H. Wright will perform the duties hitherto carried out by Dr. Stapf.

At the meeting of the Linnean Society on 4th March, Mr. R. A. Rolfe exhibited flowers of several crosses derived from the hybrid *Epidendrum kewense* and its parents, which showed Mendelian phenomena. Prof. F. E. Weiss exhibited actual specimens of the curious development of the roots of a Sycamore which had grown on very stony soil, and further illustrated the developments by lantern-slides. Miss L. S. Gibbs read a paper entitled "A Contribution to the Montane Flora of Fiji, including Cryptogams, with Ecological Notes." The Fiji group consists of two hundred islands, only eighty of which are inhabited; Viti Levu is about 4100 square miles in area, with forest-clad mountain ranges, the highest point being Mt. Victoria, 4000 feet in height. The botanical history of the group begins with the visit of H.M.S. 'Sulphur' in 1840, and in the same year the Wilkes Expedition touched at the islands. The 'Herald' called in 1856, and Dr. Seemann visited the group in 1860–61, and embodied his results in his *Flora Vitiensis*. Mr. Horne, Director of the Botanic Gardens at Mauritius, spent a year collecting in the late seventies. Thanks to these investigators, the flora of the lower parts of the chief islands are fairly well known. The author decided to confine her investigations to the region lying at 2000 feet and above, and the three spring months of August, September, and October were spent at Nadarivatu, the highest inhabited point. From the collections the flora may be described as Indo-Malayan; they contain about forty new species and many new records—thus of the eight species of *Piper* Mr. C. de Candolle found five to be new, and of *Peperomia* all seven proved novelties. The introduction concluded with some observations as to the origin of the flora and, when printed, will be followed by a systematic enumeration of the whole collection.

The volume dealing with *Alpine Plants at Home*, which forms No. 20 of Messrs. Gowan & Gray's series of "Nature Books"—in some ways the most remarkable sixpennyworths ever published—contains sixty representations of plants *in situ*, reproduced from photographs by Mr. Somerville Hastings. The effect of some of the groups is a little confused, owing to the necessity of including the surroundings of the plant which forms the subject of the picture, but on the whole they are quite admirable and we are glad to learn that a second series is in preparation. Mr. Hastings adds several pages of notes on the plants; the English, French, German, and Latin synonyms appear on each plate. It would be an improvement if the relative size of the plants could be given, but it would perhaps not be easy to do this.

Messrs. Cassell have issued a neat shilling illustrated handbook on *Sweet Peas and How to Grow Them*, by Mr. H. H. Thomas, which appears to contain a comprehensive and practical account of these popular favourites. The historical introduction might be revised with advantage; there is no reason for describing the original Sweet Pea as a "poor, small-blossomed flower"—Commelin's figure (in 1701) has flowers as large as the modern average and the same may be said of specimens grown by Uvedale before

1713. The "Painted Lady" variety was grown in England at least as far back as 1754, as well as a white-flowered variety. "Plunkenet" for Plukenet and "Prudomus" for Prodromus should be corrected in any future edition.

We have already called attention to the handsome serial *Beautiful Flowers*, which is in course of publication in monthly shilling parts by Messrs. Jack of Edinburgh. The progress of the work, the first volume of which is now completed, fully justifies the opinion we formed from the earlier numbers. It appeals of course to the horticulturist rather than to the botanist, but many of our readers combine the two aspects of plant-study in their own persons, and to them we gladly commend the book. Miss Fortescue Brickdale's studies of individual flowers seem to us particularly charming; we should be glad if there were more of these.

A recent number of the "additional series" (viii.) of the Kew *Bulletin* is devoted to "New Genera and Species of Cyperaceæ" by the late C. B. Clarke. In a prefatory note Dr. Prain gives an account of the MS. monograph, which was not arranged for publication, and would occupy 4000 octavo pages. There is no provision for printing this; the present volume, however, of 196 pages, contains the author's diagnoses of all the new genera and species described therein, and will thus provide with descriptions the numerous MSS. names written by Clarke in the herbaria in which he worked.

Dr. Theodore Cooke is to be congratulated on the completion of his *Flora of the Presidency of Bombay*, which has been brought to a close within the not unreasonable period of seven years. The two handsome volumes bring within manageable compass an account of the plants of the Presidency which should be intelligible to all who are conversant with botanical terminology; we think, however, it would have been an advantage to many if there had been added something like the treatise on elementary botany which prefaces the Kew Floras. An account of the scheme of the work from the pen of Sir George King, whose recent loss we have to deplore, will be found in our volume for 1901, p. 392.

The usefulness of the *Guide to the British Mycetozoa* published by the Trustees of the British Museum is evidenced by the fact that a third edition has just been issued. This edition has been revised by Miss Gulielma Lister, who has been intimately associated with her father in his work on the family. The very low price—3*d*.—of the work renders it accessible to all, and the forty-eight figures add to the usefulness of the letterpress.

The Linnean Society has brought out a neat volume which will serve as an appropriate souvenir of the proceedings in connection with its *Darwin-Wallace Celebration* of 1908, July 1, 1908. It was at a meeting of this Society held on July 1 exactly fifty years before that Charles Darwin and Alfred Russel Wallace "having independently and unknown to one another conceived the same very ingenious theory to account for the appearance and

perpetuation of varieties and of specific forms on our planet" communicated through Sir Charles Lyell and Sir Joseph (then Dr.) Hooker the "extracts from a MS. work on Species (Darwin) and the essay on the tendency of Species to form Varieties" (Wallace): these are now reprinted from the Society's Journal. Sir Joseph—to whom, as to Dr. Wallace and other distinguished men, the Society presented the Darwin-Wallace medal struck in commemoration of this "Jubilee of Darwinism," as it has been called—gave an interesting account of the circumstances under which the two memoirs were simultaneously presented; and Dr. Wallace gave an equally interesting sketch of the early relations between Darwin and himself. The other recipients of the medal were Prof. Haeckel, Prof. Weismann, Prof. Strasburger, Dr. F. Galton, and Sir E. Ray Lankester, the last three of whom delivered suitable addresses: Lord Avebury, one of the earliest to give his adhesion to the new movement, also delivered an address. The volume, which contains excellent portraits of Darwin and the recipients of the medal, gives an account of the various proceedings in connection with the celebration.

The *Survey and Record of Woolwich and West Kent*, which has already been announced in these columns, is promised at an early date. It will form a volume of 600 pages and the price has been advanced to 6*s*. net. Messrs. J. F. Bevis and W. H. Griffin are the "sectional editors" for Botany; they will be helped in the flowering plants by Messrs. R. H. Chandler, C. H. Grinling, and W. Williams, and in the Cryptogams by Messrs. E. M. Holmes and Rudolf Beer.

We find that we have omitted to publish any notice of our contributor Mr. John Benbow, who died more than a year ago. He was born at Maidenhead on March 6, 1821, and died at Uxbridge, where he had long resided, on Feb. 10, 1908, within a month of his 87th birthday. In the early sixties he devoted much attention to ferns, being especially fond of South Devon and the country round Honiton and Lyme Regis. When a young man, he lost an eye in the hunting-field, but he was able to make singularly good use of the other, and for many years, beginning with 1890, recorded for Middlesex in this Journal many plants which had eluded the search of the authors of the Flora of that county, or were therein recorded as extinct. He was keenly interested in the orchids growing on the chalk at Rickmansworth; these he visited regularly every year, and seemed at last to know when they would appear and when they would not; a note on their irregular appearance in Middlesex will be found in Journ. Bot. 1901, 278. He worked up the Rubi (Journ. Bot. 1899, 255) and Mosses of Middlesex (see Journ. Bot. 1894, 186, 369, and later volumes). Benbow was a great walker; when between seventy and eighty he would still tramp his twenty odd miles in the day, working Middlesex and the south of Bucks and Herts; during this time he worked chiefly at Mosses, and, when not walking, spent many hours a day at the microscope; he was also a frequent visitor at the National Herbarium. During his last five or six

years his walking powers gradually failed him, and he then fell back upon his garden flowers. His herbarium, chiefly of Middlesex and Bucks plants, and a folio MS. in which these are entered in systematic order in relation to the Flora of the Uxbridge district and that of Middlesex, were presented by his sons to the National Herbarium. Benbow became a Fellow of the Linnean Society in 1887.

Alexander Whyte died at High Barnet on Dec. 21 last, in his seventy-third year. He was born at Fettercairn, Kincardineshire, where his father was parish minister, and as a young man went to Ceylon, where he engaged in coffee-planting. He subsequently became attached as naturalist to Sir H. H. Johnston's expedition to Central Africa, and in 1891 sent to the National Herbarium an important collection of plants from Milangi, which formed the subject of a paper by the staff of the Herbarium, published in the *Transactions of the Linnean Society*, iv. 1–67. In this paper many new species were described, several being named after the discoverer; the most noteworthy is the Milangi Cedar, *Widdringtonia Whytei* Rendle, which was further discussed in this Journal for 1906, p. 190. In 1898 Whyte's services were secured by the British Administration in Uganda, and in 1902 he was appointed Director of Agriculture in the East African Protectorate. He retired from the Government service in the following year, and in 1904–5 visited Liberia in connection with the rubber industry; here he made a collection, the novelties of which were described by Dr. Stapf in Journ. Linn. Soc. xxxvii. 79; these are in the Kew Herbarium, to which Whyte's later collections from East Africa were also diverted. A full account of Whyte's work will be found in the *Gardeners' Chronicle* for Jan. 2, in which, however, his first collection in 1891 is not mentioned.

The *Salisbury Diocesan Gazette* for December last contains an interesting report of the "Wild Flower Classes" for children which have for many years been established in various parishes of the diocese. The Diocesan Secretary reports that 47 boys and 87 girls, varying in age from five to fourteen years and representing seven parishes, were on his register for 1908; the list of prizes shows that girls are the more successful as they are the more numerous competitors. The following paragraph will, we think, be read with interest, as showing the methods pursued and instructions given in the various parishes; the *Gazette*, which costs only a penny, may be obtained from Messrs. Brown & Co., New Canal, Salisbury:—"At Charlton All Saints, flowers are occasionally examined in connection with Nature Study, and the children are eager in consulting books of reference kept at the school. At Durrington a Wild Flower Class has been taught twice a week for many years during the winter, one of Johnson's 'Botany Readers' being used, and the chief Orders pointed out. At Lydlinch it was found that flowers pressed in a former year were remembered in this. When it is thought that any specimens are being overlooked, the search is assisted by picture and description. At Marshwood the flowers, with collectors' names

attached, are brought upon three days in the week. If the discoverer cannot name a flower, other children are asked to do so, and the knowledge of all is tested from time to time by the naming of flowers exhibited to the class. Lessons are given on typical plants in their seasons, and drawings are made to show structure. At Melksham illustrations of specimens to be searched for are employed. At Stratford-sub-Castle the peculiarities of uncommon flowers are explained. Plants are labelled by finders if the name be known, if not by the conductor. At Tarrant Keynstone collecting is combined with Nature Study in school. The flowers in season are named and short descriptions given. The names of different parts, varieties of leaf and root are learned. Descriptions are sometimes written and drawings made. At Wimborne some instruction has been given in school. Thirty-two boys were taken for five days' walk in the Isle of Purbeck, and one of them had over 100 specimens named. At Wylye many new members are filling the places of children who have left. Much encouragement is given and careful work carried on. The marking I have frequently advised is followed and found to answer well. It is considered impossible, under present arrangements, to forward particulars of names and marks from Fonthill Gifford, but I am informed that much has been effected by the untiring energy of the schoolmistress. Names and places of discovery are entered, while the children acquire some knowledge of plant-life, and are eager to claim first finds. A large number of specimens has been brought in during the year, and others which came from a distance were exhibited."

A NEW county flora—*The Botany of Worcestershire*—is announced for publication by Messrs. Cornish, of Birmingham, by Messrs. John Amphlett and Carleton Rea, the mosses and hepatics contributed by Mr. J. E. Bagnall. "The work which will be issued almost immediately is the result of a life's observation on the part of the authors, who have long been known as authorities. . . . . It is arranged on the most approved method, it is exhaustive, it has been most carefully printed, the proofs have been most carefully revised by the authors and other botanists to eliminate the least possibility of error." With such qualifications, the price of the volume—25*s.* net—can hardly be considered extravagant, although it is considerably in excess of that usually demanded for books of that kind. "The Flora and Ferns" are "arranged and named according to the Tenth Edition of the London Catalogue."

THE fifth part of Mr. F. N. Williams's *Prodromus Floræ Britannicæ* is now ready. It includes eight of the sympetalous families—*Adoxaceæ*, *Caprifoliaceæ*, *Rubiaceæ*, *Apocynaceæ*, *Gentianaceæ*, *Oleaceæ*, *Solanaceæ*, and *Asperifoliaceæ*. The edition is strictly limited, therefore former subscribers and those who desire to obtain the new part are requested to notify the publisher, C. Stutter, 110 High Street, Brentford, Middlesex, enclosing 2*s.* 8*d.* for the book and postage.

WE are glad to note that at the recent election to the Royal Society Dr. Rendle was selected for the fellowship of that body.

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THE

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BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

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The Journal of Botany was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

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A. Euphrasia minima.
B. Indian Mosses.

MOSSES FROM THE WESTERN GHATS.

By H. N. Dixon, M.A., F.L.S.

(Plate 497 B.)

From time to time during the last two years I have received from Mr. G. B. Savery small collections of mosses sent to him by Mr. L. J. Sedgwick from several localities in the southern part of the Bombay Presidency, mostly within the region of the Western Ghâts; partly collected by Mr. Sedgwick himself, partly by Mr. R. M. Maxwell, the latter being gathered in the Kanara Jungles, between the Ghâts and the sea. These mountains are, as is well known, subject to an extraordinary rainfall, attaining one hundred and fifty inches in some of the localities from which the mosses came.

The district is not very far north of that of Coorg, from which Brotherus has recently described a rich collection of mosses gathered by Dr. T. L. Walker (*Contributions to the Bryological Flora of Southern India, Calcutta, 1899*), and the mosses sent by Mr. Sedgwick naturally exhibit a close relationship with these (as well as, though in a somewhat less marked degree, with the mosses of the Neilgherry Hills, still further south), and also, like them, indicate a very promising bryological field of study. I give a list here of the species so far received (reserving one or two which have not yet been satisfactorily determined), with the hope that the interest of those already sent may stimulate the collectors to further investigation of a region which is at present little known bryologically, but which has already materially contributed to our knowledge of several genera and species.

Octoblepharum albidum (L.) Hedw. c. fr. Stems of Toddy Palm, Thana, Konkan, Feb. 1908; leg. Sedgwick (no. 5).

Fissidens splachnobryoides Broth. Earth banks on new road cutting, Thana, Konkan, July, 1908, st.; leg. Sedgwick (no. 9). On earth on a step by a stream, Trimbakeshwar, Nasile District, Sept. 1908, c. fr.; leg. Sedgwick (no. 7).

These two plants differ somewhat in size, colour, and appearance, but are identical in structure, agreeing perfectly with the description of *F. splachnobryoides* given by Fleischer (*Musci . . . . von Buitenzorg*, i. 21). It is not clear why Brotherus places this species in his Section Reticularia ("Zel'en . . . . stets parenchymatisch"), since the areolation, while wide and lax, is distinctly prosenchymatous.

F. splachnobryoides has hitherto been known from New Guinea and Java only, and in the sterile (♀) condition alone. I give, therefore, a short description of the fruiting characters:—

Seta terminal, flexuose, 2–3 mm. long; capsule minute, erect, symmetrical, wide-mouthed and subturbinate when dry, contracted below the mouth, 1 mm. long (incl. the lid); lid conical-subulate,

straight or slightly curved, as long as the capsule; peristome teeth when dry spreading, strongly incurved when moist, deep red; divided to two-thirds their length into two paler, filiform branches, verrucose with papillæ and spiral thickenings; cells of exothecium oval-rounded, very strongly collenchymatous. Spores bright green (by transmitted light), smooth and translucent, 15–20 μ.

Fissidens (*Semilimbidium*) *Walkeri* Broth. c. fr. On an earth bank, submerged during the rainy season, by the Kistna River, Walwa, Satara District, Jan. 1908; leg. Sedgwick. A pretty, bright green little plant, which without doubt, I think, belongs here. It agrees in all points with Brotherus' description, except that the serrulation of the leaves is, as a rule, very indistinct, while in *F. Walkeri* it is described by Brotherus as "f. ob cellulas prominentes minutissime serrulata."

Another species of *Fissidens* (*Semilimbidium*) is at present undetermined.

Hyophila cylindrica (Hook.) Jaeg. c. fr. Stony banks and walls, Lonavli, W. Ghâts, Sept. 1907 and Sept. 1908 (nos. 1, 6).

Barbula consanguinea (Thw. & Mitt.) Jaeg. st. On tiles by paths in Ganeshkhind Botanical Gardens, Poona, Sept. 1907; leg. Sedgwick. Variable in height and density of foliation. In this plant and in specimens from Tonkin (comm. Paris) I find the basal margin narrowly recurved; Fleischer describes the leaves as "unten meist *eng eingebogen*."

Pottia vernicosa (Hook.) Hampe, c. fr. On a wall, Thana, Konkan, Aug. 1908; leg. Sedgwick (no. 10).

Macromitrium sulcatum Brid. c. fr. Rocks near the coast, Kanara Jungles, W. Ghâts, Oct. 1908; leg. Maxwell (no. 16).

Splachnobryum indicum Hampe & C. M. c. fr. Flower-pots and walls in garden, Thana, Konkan, Aug. 1898; leg. Sedgwick (no. 11). This locality forms an intermediate link between the two already known, *viz*. Calcutta and Java.

Funaria hygrometrica Sibth. c. fr. Stonework of a small bridge, Lonavli, W. Ghâts, Sept. 1908; leg. Sedgwick (no. 2). This is no doubt *G. leptopoda* Griff. (=*F. nepalensis* C. M.), but Fleischer and other authors are clearly right in sinking these in the cosmopolitan *F. hygrometrica*.

Brachymenium turgidum Broth. (ex Dixon, Rev. Bry. 1908, p. 94), c. fr. Timber of small bridge, Lonavli, W. Ghâts, alt. circa 2000 ft.; Sept. 1907 (no. 4). Branches of cactus, Lonavli, 1907 (no. 5). Trees, Lonavli, Sept. 1908 (no. 4 *bis*). Trees near Trimbakeshwar, Nasile District, alt. 2500–3500 ft., Sept. 1908. All leg. Sedgwick.

This well-marked species, already described as new, *loc. cit.*, would appear to be fairly common in the district about Lonavli.

B. nepalense Hook. c. fr. Walls, Lonavli, W. Ghâts, alt. circa 2000 ft., Sept. 1907; leg. Sedgwick.

Anomobryum cymbifolium (Lindb.) Broth. (*Bryum filiforme* Mitt. M. Ind. Or.), st. Stony banks, Lonavli, W. Ghâts, Sept. 1908; leg. Sedgwick.

Bryum coronatum Schwaeg. c. fr. Station walls, Lonavli, W. Ghâts, &c.; leg. Sedgwick (nos. 2, 7, 12).

Another species of *Bryum* remains at present undetermined.

Philonotis revoluta V. d. Bosch & Lac. st. Stony banks, Lonavli, W. Ghâts, Sept. 1908; leg. Sedgwick. A small sterile fragment only, which I think however may be safely referred here.

Erpodium Mangiferæ C. M. st. On bark of *Artocarpus integrifolia*, Ghatkopar, March, 1908; leg. Sedgwick (no. 6).

There could be no doubt, from an examination of this plant, that it belonged either to *E. Mangiferæ* C. M. or to *E. Bellii* Mitt. There being no specimens of the latter in either of the National Collections, Mrs. Britton kindly sent me duplicates of the type from Mitten's herbarium for examination and subsequent deposit in the Herbaria of South Kensington and Kew. Of *E. Mangiferæ*, I have been able to examine two specimens at South Kensington, one being a duplicate of the type (leg. Kurz, no. 1915). It may be remembered that Brotherus, in dealing with *E. Bellii* (Engl. & Prantl, *Pflanzenfamilien, Musci*, p. 709), writes: "*E. Bellii* Mitt. in Ostindien, von welcher Art *E. Mangiferæ* C. Müll., auf der Rinde der *Mangifera indica* kaum specifisch verschieden ist." It seemed desirable as far as possible to set the question at rest, and a careful comparison of the two plants appears to me quite to confirm Brotherus' conclusion. C. Müller described *E. Mangiferæ* from sterile plants, while Mitten's *E. Bellii* was a fruiting plant with marked characters in the capsule, and he consequently dwells upon this, almost ignoring the vegetative characters. Hence it is impossible to judge from the descriptions alone whether the two plants are identical; the most that can be said is that there is nothing in the descriptions inconsistent with their identity. A slight discrepancy in the descriptions of the leaf apex is explained by the fact that the leaves vary on the same stem, from sharply acuminate on the fertile branches to subobtuse at the apex of the sterile branches; while an apparent disagreement in the areolation is entirely due to the fact that Mitten's description, "cellulis parvis rotundis obscuris," is quite inaccurate, the cells in his own type specimens being exactly as C. Müller describes them, in mid-leaf rather large and hexagonal, more elongate at apex and mid-base, shorter and transversely hexagonal-rectangular towards basal margin.

In comparing the types of the two species I have only been able to detect one difference of any—and that perhaps doubtful—importance. In *E. Mangiferæ* the cells (in the dead plant) are described by C. Müller as either filled with the primordial utricle or finally empty. As a matter of fact, I find them in his plant somewhat variable; the primordial utricle, as a rule, shrinking from each side of the rhomboid-hexagonal cells, forming an irregularly rhomboid mass filling about half the width of the cell cavity, and with its chlorophyll contents fairly evenly distributed. In *E. Bellii* this is also frequently the case, but more often the primordial utricle shrinks to a narrow fusiform somewhat vermicular

shape, very clearly defined, occupying only about one-third the width of the cell cavity, and therefore, when viewed with a low magnification, appearing something like a broad partition dividing the cell longitudinally into two irregular halves. The chlorophyll contents of this shrunken cell plasma are frequently evenly distributed throughout it, but more usually are concentrated at the extreme ends, *i. e.* at each apex of the cell cavity, in a dark green, somewhat highly refractive point, having all the appearance, when viewed from above, of a papilla. It is indeed difficult, until the leaf has been viewed in section, to persuade oneself that the cells are absolutely smooth. This curious arrangement of the primordial utricle and chlorophyll contents give a very striking appearance to the areolation, especially the regular rows of marginal subrectangular cells towards the base (*cf.* Plate 497 B, 7).

It is very doubtful, however, whether this can be considered a character of systematic importance. In the living plant it would not exist; it is not constant throughout the leaves in Mitten's plant, and it is quite conceivable that under slightly different conditions of drying, &c., *E. Mangiferæ* might exhibit the same peculiarity. As a matter of fact, Mr. Sedgwick's plant does exhibit a distinctly intermediate character, the cell plasma frequently being contracted in exactly the same way as in Mitten's specimens, though without the peculiar appearance caused by the aggregation of the chlorophyll contents at the cell ends.

I have therefore no hesitation in saying that my study of these plants quite confirms the views of Brotherus that Mitten's plant and that of C. Müller are identical. In this case it would appear that—unfortunate though it may seem, since Mitten's species was founded upon a well-developed fruiting plant, and C. Müller's on barren specimens only—C. Müller's name must have the priority. *E. Mangiferæ* was published in vol. xxxvii. of *Linnæa* for 1871–3, p. 178, and almost certainly appeared in 1872 (the heading reads, "Eingereicht am 5 Novbr. 1871"). *E. Bellii* was published in Journ. of Linn. Soc. vol. xiii. (Bot.), and the part in which it occurs was issued March 21st, 1873.

The plant must therefore be known as—

Erpodium Mangiferæ C. M. in *Linnæa* xxxvii. 178 (1871–3).

Syn. *E. Bellii* Mitt. in *Journ. Linn. Soc.* (Bot.) xiii. 307 (March, 1873).

Mr. Sedgwick's plant had a single loose fragment of a capsule, but otherwise only exhibited male flowers. It is greatly to be hoped that Mr. Sedgwick may be able to gather it in fruit, and so confirm the identity with Mitten's plant.

Pterobryopsis Maxwellii Card. & Dixon, sp. nov. (Plate 497 B, 1–4). Among specimens sent from Western India by Mr. L. J. Sedgwick was a fruiting plant gathered by R. M. Maxwell, which Mons. Cardot determined as an undescribed species of *Pterobryopsis* allied to *Meteorium Hookeri* (Mitt.) (*Calyptothecium Hookeri* Broth.). The genus *Pterobryopsis* was founded by Fleischer in 1901, and described in *Hedwigia*, vol. xlv. p. 56 (1905), to include

certain species hitherto referred to *Pterobryum*, *Garovaglia*, &c.; it is maintained by Brotherus (Engler & Prantl, *Pflanzenfamilien, Musci*, p. 801). *Pterobryopsis*, however, as defined by Fleischer, is somewhat different from the genus as understood by Brotherus, as the latter author removes certain species, and creates for them the small genus *Jægerinopsis*.

Pterobryopsis is placed by Brotherus under the tribe *Pterobryeæ* of *Neckeraceæ*, while *Calyptothecium* is referred by him to the tribe *Neckereæ*. The principal differences in the characters laid down by him for the two genera are as follows :—

Pterobryopsis : Capsule with stomata; peristome inserted far below the orifice; dorsal surface of teeth usually bearing irregular thickenings, smooth, not papillose. Ring broad; preperistome wanting.

Calyptothecium : Capsule without stomata; peristome inserted near the orifice; dorsal surface of teeth normally developed; preperistome present. Ring wanting.

The plant gathered by Mr. Maxwell combines some of the characters of each of these; thus the capsule is without stomata, but there is no preperistome, the teeth are inserted at some distance below the orifice, and there is a narrow longitudinal waved or zigzag ridge of irregular thickening along the dorsal surface of the outer teeth.

In considering the true position of the plant we were driven to the conclusion that these genera, as treated by Brotherus, are somewhat artificially constituted. The character on which most stress is laid, and by reason of which they are placed in different tribes of *Neckeraceæ*, is the development of the peristome, especially as refers to the dorsal surface of the outer teeth, normal in *Calyptothecium*, but usually presenting irregular thickenings in *Pterobryopsis*. Apart from this character, which it is reasonable to look upon as of systematic importance, there is little to separate the two genera, or at least certain sections of them. If, now, one compares the figures in Brotherus' work, it will be seen that the outer peristome teeth of *Pterobryopsis breviflagellosa* (C. M.) (fig. 600) are figured as entirely normal on their dorsal surface,* while (fig. 623) those of *Calyptothecium nitidum* (Hook.) are shown with the teeth irregular and with thickenings on their dorsal surface, quite comparable in character to, though less in degree, than those of *Pterobryopsis Wightii* (Mitt.) (fig. 601). Moreover, the peristome teeth of *Meteorium Hookeri* Mitt., which Brotherus places under *Calyptothecium* (Section *Pseudo-squarridium*), are by no means normally developed, being very irregular, with numerous thickenings on their dorsal surface very similar to those of *Pterobryopsis Wightii* as figured by Brotherus.

It appears to us, therefore, that if the generic distinction between *Pterobryopsis* and *Calyptothecium* is to be maintained it must

---

* Fleischer also includes this in *Pterobryopsis*, though describing the peristome of the genus as "sehr rudimentär."

be based principally on the structure of the dorsal surface of the peristome teeth, less stress being laid upon the presence or absence of stomata, and the degree of development of the inner peristome; and, moreover, that it would be more in harmony with this arrangement, and at the same time would leave the genus *Calyptothecium* much more clearly defined and homogeneous, to remove Sections II. and III. of the latter genus, as given by Brotherus, comprising the two species *C. Hookeri* and *C. nitidum*, to *Pterobryopsis*. This would leave to *Calyptothecium* only those species comprised in Section I., *Pseudo-Neckera* Broth., with flattened stems of Neckeroid habit, and forming a natural group.*

The species of *Pterobryopsis* as then constituted will be grouped as follows:—

PTEROBRYOPSIS Fleisch. (emend. Brotherus, et Card. & Dixon).
Sect. I. *Pseudo-Calyptothecium* Broth.
Sect. II. *Pseudo-Pterobryum* Broth.
Sect. III. *Eu-Pterobryopsis* Fleisch.
Sect. IV. *Pterobryodendron* Fleisch.
Sect. V. *Pseudo-Squarridium* (Broth. sub *Calyptothecio*).
P. Hookeri (Mitt.) Card. & Dixon.
Syn. *Meteorium Hookeri* Mitt.
Calyptothecium Hookeri Broth.
P. Maxwellii Card. & Dixon.
Sect. VI. *Ptychobryum* (C. M. sub *Meteorio*).
P. nitidum (Mitt.) Card. & Dixon.
Syn. *Meteorium nitidum* Mitt.
Calyptothecium nitidum Broth.
Meteorium biplicatum C. M. (*teste* Brotherus).

The following is a diagnosis of the new species:—

Pterobryopsis Maxwellii Card. & Dixon, sp. nov. Dioica; robusta, lutescenti-viridis, subnitida; caulis repens, elongatus, flexilis, *sat regulariter pinnatim ramosus*, *ramis approximatis*, circa 2 cm. longis, vix compressis, sæpe arcuatis, simplicibus, obtusis; folia humida et sicca squarrosa, apice incurvo, paullo concava, ad angulos rotundata *vix auriculata*, 2·5 mm. longa, 1·75 mm. lata,

---

* Since the above was written I have received the recently published volume of the *Musci der Flora von Buitenzorg*, in which Fleischer gives his latest views of these genera, somewhat modified since the publication of the papers above quoted. He now, recognizing the somewhat unsatisfactory distinction between *Pterobryopsis* and *Calyptothecium*, makes the latter genus principally depend upon the *immersed capsule with preperistome, and the very largely developed basal auricles*. Basing it thus especially on these characters, he transfers from *Pterobryopsis* the species included there by Brotherus under Section *Pseudo-Calyptothecium* (or at least four of those species), ranking them under *Calyptothecium* in a new Section IV., *Pseudo-Pterobryopsis* Fleisch. This appears to us still to leave unremedied the anomalies of peristome, &c., pointed out above, without making either genus very markedly more homogeneous; and we still prefer our proposed rearrangement, which, while still leaving considerable diversity in *Pterobryopsis*, at least renders *Calyptothecium* a compact and homogeneous genus.

late cordato-ovata, *breviter late acuminata, apice subacuto*; ramulina paullulo angustiora, ovato-acuminata, *apice subobtuso*; omnia margine plano, integro vel minute erose-denticulato, costa *valida*, 35–50 μ lata, sub apice evanida; cellulis omnibus angustis, lævibus, inferioribus linearibus, superioribus brevioribus elliptico-rhomboideis, *alaribus paucis, sub-rectangularibus inconspicuis*, infimis juxta costam incrassatis, inter se porosis; perichætium calyciforme, bracteis erectis, numerosis, anguste ligulatis apice obtuso, late costatis, marginibus subdenticulatis; theca subsessilis, immersa, elliptico-ovalis, sub ore constricta, fusca, operculo conico subulato; exothecii cellulæ irregulariter hexagono-ellipticæ parum incrassatæ, stomatibus nullis; annulus latus; peristomium duplex, longe sub orificio insertum; exostomii dentes lanceolati, remote parce lamellati, aurantiaci, læves, *media linea dorsali angustissime irregulariter tenuiter incrassata notati*; vetustate nonnunquam perforati; endostomium *aurantiacum, membrana basilari brevissima, haud exserta*, processibus 16, dentes fere æquantibus, *anguste linearibus*, linea media prædita, *articulatis, intus irregulariter nodosis*, raro brevissime ramulosis, lævibus; ciliis nullis. Sporæ 30–50 μ lævissimæ, brunnescentes, valde chlorophyllosæ. Calyptra haud visa.

Hab. In arboribus, interdum ad saxa, Kanara Jungles, Bombay Presidency, India; February, 1908. Leg. R. M. Maxwell. Nos. 3, 14.

This species most nearly resembles *Pterobryopsis Hookeri* (Mitt.) Card. & Dixon, which, however, differs markedly in the more distant and irregular branching, more distant leaves, which are widely amplexicaul and auriculate at base, more sharply denticulate, with an abrupt acute point, and much thinner and shorter nerve; the capsule, moreover, is smaller, and the peristome quite different.

P. nitida (Mitt.) Card. & Dixon has widely auriculate, plicate leaves, dfferent peristome, &c. *Calyptothecium tumidum* (Dicks.) Fleisch. has more Neckeroid foliation, non-acuminate leaves, faint nerve, &c. *Pterobryopsis Wightii* (Mitt.) Broth. and *P. patula* Broth. have cochleariform, strongly auricled leaves, and faint nerve. *P. breviflagellosa* (C. M.) Fleisch. has distinct alar cells, and an entirely different fructification. All the other Indian species of *Pterobryopsis* belong to the Section *Pterobryodendron* Fleisch., with exserted capsule, cymbiform leaves, &c.

The irregular thickening of the dorsal surface of the outer teeth is often very indistinct, and only visible by careful focussing, or by viewing the tooth laterally, and in old peristomes may also be lost or obscured by perforations.

Pterobryopsis (§ Eu-Pterobryopsis) **kanarensis** Card. & Dixon, sp. nov. (Plate 497 B, 5, 6). *P. frondosæ* (Mitt.) Fleisch. habitu similis; caulis primarius repens (brevis?), secundarii erecti, densi, firmi, 3–4 cm. alti, densiuscule subpinnatim ramosi, ramis brevibus, sæpe curvulis, dense foliosis. Folia imbricata, sicca madida erecto-patentia, ovata, concavo-cymbiformia, *longe lateque decurrentia, nec auriculata nec amplexicaulia*, apiculo *brevi* acuto

recurvo, marginibus planis, integerrimis, nervo tenui prope medium evanido. Cellulæ parvæ, anguste rhomboideo-lineares, haud chlorophyllosæ, læves, ad basin *subito majores quadratæ*, 20–25 μ *latæ*, *numerosæ*, *aurantiacæ*, *totam fere folii latitudinem occupantes*, *alasque latas decurrentes conspicuas aurantiacas formantes*.

Planta feminea sola nota; flores feminei in ramis axillares, bracteæ *paucæ*, externæ 2–3, patentes parvæ, internæ 3–4, convolutæ, subito in apiculum constrictæ. Cetera ignota.

Hab. Ad saxa, prope litus maritimum, Kanara Jungles, Bombay Presidency, Oct. 1908. Leg. R. M. Maxwell. No. 15.

Allied to *P. frondosa* (Mitt.), *P. acuminata* (Hook.), *P. Walkeri* Broth., *P. Kegeliana* (C. M.) Fl., &c., but differing from these and all the allied species in the leaves not auriculate, but widely and conspicuously decurrent. This is not evident when a single leaf is examined, as it is impossible to detach a leaf without tearing away the fragile alar cells across the level of the insertion of the mid-leaf at base of nerve; but viewed *in situ*, or after removing several leaves from a stem, the decurrent wings are very strikingly conspicuous. The lax, bright orange, alar cells, short points to the leaves, and the nervæ, ceasing at about mid-leaf, are also characters which separate it from others of the genus with somewhat similar habit.

Trachypodiopsis blanda (Mitt.) Fleisch. st. On stones and trees near Trimbak, Nasile District, Sept. 1908; leg. Sedgwick (no. 11). Det. Fleischer. A robust, more or less terrestrial form, very different in habit from the extremely slender fruiting arboreal plant which I have from Sikkim, &c.

Levierella fabroniacea C. M. c. fr. On stones and trees near Trimbak, Nasile District, alt. 2500–3500 ft., Sept. 1908; leg. Sedgwick (no. 10). Growing in large sheets and in good fruiting condition; an interesting extension of the range of this recently described species, hitherto known, I believe, only from two or three localities in the N.W. Himalaya and the Central Provinces of India. It is rather more robust than the plant figured by Brotherus, and also than the specimen in the Kew Herbarium, but otherwise quite agrees.

Stereophyllum tavoyense (Hook.) Jaeg. c. fr. Tree-trunk, Thana District, Konkan, Nov. 1908; leg. Sedgwick (no. 17).

I have to express my thanks for help, especially to Mons. Cardot, and to the authorities at the British Museum.

Explanation of Plate 497 B.

Figs. 1–4, *Pterobryopsis Maxwellii*; peristome. 1, outer tooth, dorsal surface; 2, ditto, ventral surface; 3, process, viewed ventrally; 4, ditto, viewed laterally (dorsal surface to right). All × 120. Figs. 5, 6, *P. kanarensis*; leaves. 5, leaf *in situ*, × 25; 6, basal areolation, × 40. Fig. 7, *Erpodium Bellii* Mitt. (from duplicate of type); supra-alar marginal cells, × 250.

EUPHRASIA MINIMA.

By W. P. Hiern, M.A., F.R.S.

(Plate 497 A.)

The announcement of the discovery of the yellow-flowered eyebright in England by Miss Helen Saunders (p. 30), and Mr. C. E. Salmon's further note (p. 74), reporting an earlier gathering and later recognition, are calculated to create among British botanists sufficient interest to justify some special information. It has now been recorded for four stations in West Somerset, which range between two and six and a half kilometres distant from the Devon boundary, and, as regards three of them, between 366 and 427 m. in altitude.

In this paper, for convenience and simplicity, the plant is treated as a good and independent species; but the adoption of such treatment is not intended to imply any settled or certain conviction on the point. The late F. Townsend, in the *Journal of Botany* for June 1884, discussed at considerable length the question whether *Euphrasia officinalis* L. represents a single polymorphic species, or a collective species; at that time he expressed his own conclusion that all the European forms, with which he was acquainted, are members of a single species, and that none of these members can be ranked as of a higher grade than a subspecies. This opinion he afterwards modified; for in the Journal of September 1897, in the introduction to his Monograph of the British species of *Euphrasia*, after remarking that the geographical area of *E. minima* Jacq. is found within the area of the remotely allied *E. stricta* Host, and that intermediate forms may and do exceptionally occur, he added: "The botanist is therefore forced to recognize that certain forms have become and are more or less stable, and to such an extent that they may be treated as permanent enough to constitute and be reckoned and described as species."

On the other hand, P. Bubani, who died in 1888, and whose posthumous *Flora Pyrenæa* was edited by Prof. O. Penzig, admitted only one species, and with reference to the forms of Eyebright, vol. i. p. 272 (1897), wrote: "Montes . . . plures alunt formas, quæ speciei polimorphiam mihi magis magisque demonstrarunt ita ut a propositis neotericorum speciebus abhorream, Natura, non phantasia, monente."

An opinion has been expressed in favour of the strong probability that *E. minima* is the type of *E. officinalis* L.

Among British forms the yellow colour throughout the corolla in the species under notice is unique, and this character has been recorded among Continental forms for more than three hundred years, and more than two centuries ago by some authors specific rank has been conceded to it.

In British floras, until Groves's posthumous edition of Babington's *Manual* of 1904, only one species of *Euphrasia* has been admitted. In that edition, however, thirteen species are enume-

rated, and in addition *E. campestris* Jord. is given as perhaps also British. Since that time Mr. F. H. Davey has named, described, and figured in the Journal for June 1907 a new species from South Devon and West Cornwall, namely, *E. Vigursii* F. H. Davey. Moreover, Archer Briggs, in his *Flora of Plymouth*, p. 245 (1880), stated that among the several forms which he had gathered there was one from South Devon answering to *E. montana* Jord. Thus, if this be reckoned, sixteen species of *Euphrasia* may be counted, as previously suggested for the British Isles, and *E. minima* now makes a seventeenth.

The references and synonymy are as follows:—

EUPHRASIA MINIMA Jacq. *apud* J. C. Schleicher, Cat. Plant. Helvet. p. 22, n. 303 *β* (1800) name only; (Lamarck &) De Cand. Fl. France, ed. 3, iii. p. 473, n. 2419 (1805) with description; Pers. Syn. Pl. ii. p. 149 (1806); Wettst. Monogr. Euphras. p. 151, n. 26, tab. iv. figs. 223–255, tab. viii. figs. 10–14 (1896); Chabert in Bull. Herb. Boiss. 1902, p. 136; H. Coste, Fl. France, iii. p. 44, cum ic. (1906); non Willk. & Lange.

Euphrasia officinarum C. Bauh. Enum. Plant. p. 443 (1596) partly, and Pin. Theatr. Bot. p. 233 (1623) partly; P. Bubani, Flora Pyrenæa, ed. O. Penzig, i. p. 271 (1897) partly.

Euphrasia lutea, minima, Alpina subrotundo folio nigricante Boccone, Mus. Piante Rare, p. 64 (1697), tab. 60 (*Euphrasia minima lutea*).

Euphrasia, species iv., Tournef. Instit. Rei Herb. ed. 3, p. 174 (1719).

Euphrasia Helvetiorum parva luteis floribus J. J. Scheuchz. It. Helvet. Alp. i. p. 36 (1723).

Euphrasia foliis ovatis lanceolatis argute dentatis, var. *flore minori barba tota flava galea purpurea aut flava* Haller, Hist. Stirp. Helvet. i. p. 133, n. 303 (1768) partly.

E. officinalis C., Allioni, Fl. Pedem. i. p. 60, n. 213, C (1785).

E. officinalis d., Villars, Hist. Pl. Dauphin. ii. p. 410 (1787).

E. officinalis var. *β* Lamarck, Encycl. Méth. p. 400 "Peut-être devroit-on la distinguer comme espèce?" (1786–1788).

Bartsia humilis La Peyr. Hist. Abr. Pl. Pyr. p. 344 (1813).

E. officinalis var. *minima* Duby, Bot. Gall. i. p. 354 (1828); G. Don, Gen. Syst. iv. p. 610 (1837); Benth. in DC. Prodr. x. p. 553 (1846).

E. minor Link, Handb. Erk. Gew. i. p. 514 (1829).

E. pratensis var. *α minima* L. Reichenb. Fl. Germ. Excurs. p. 359 (1830–1832) partly.

E. nemorosa C. *parviflora*, *β minima* Soyer-Willem. Sur l'Euphr. off. p. 30 (1833–4).

E. officinalis γ parviflora Gren. & Godr. Fl. Fr. ii. p. 605 (1850) chiefly.

E. exigua Reuter in Compt. Rend. Soc. Hallér. p. 123 (1854–1856).

E. minima var. *minor* Jord. in Grenier, Flore Jurass. p. 570 (1865); Wettst. *l. c.* p. 160, tab. viii. fig. 14 (1896).

E. micrantha Schur, Enum. Pl. Transs. p. 510 (1866).
E. minima, forma *bicolor* and forma *pallida* Gremli, Excurs. Fl. ed. 4, p. 324–5 (1881).
E. officinalis forma *E. minima* T. Caruel, Fl. Ital. vi. p. 472 (Aug. 1885).
E. variabilis Freyn in A. Kerner, Sched. Fl. Austro-Hung. iv. p. 55 (1886).
E. minima, forma *flava*, and var. *subaristata* Gremli, Neue Beitr. Fl. Schweiz, iv. p. 26 (1887).
E. minima forma *alba* Favr. in Gremli, Neue Beitr. iv. p. 26 (1887); Wettst. *l. c.* p. 159, tab. viii. fig. 14.
E. minima var. *hispidula* Favr. in Gremli, Neue Beitr. iv. p. 26 (1887); Wettst. *l. c.* p. 161, tab. iv. figs. 239–243, tab. viii. fig. 12.
E. capitulata var. *glabra* Towns. in Journ. Bot. 1890, p. 165.
E. capitulata var. *eglandulosa* Towns. *apud* Wettst. *l. c.* p. 153 (1896).
E. minima forma *purpurascens* Wettst. *l. c.* p. 159.
E. minima var. *Schleicheri* Wettst. *l. c.* p. 161, tab. iv. figs. 223–238, 244–248, 255, tab. viii. figs. 11, 13.
E. minima var. *elatior* Favrat apud Wettst. *l. c.* p. 162.
E. minima var. *maxima* Schröter *apud* Wettst. *l. c.* p. 162.

The species is native principally in mountainous and alpine places, and is widely distributed, extending to such habitats in central and southern Europe; for instance, in the Pyrenees, the South of France, the Alps, the Carpathians, the Apennines, and the Balkan Peninsula; moreover, in Norway, Sweden, and Lapland; also outlying stations in Asia Minor.

Mr. F. N. Williams informs me that the specimen of *Euphrasia officinarum* in Bauhin's herbarium at Basle is undoubtedly *E. minima*.

A sheet of specimens from Jacquin's herbarium is in the National Herbarium in Cromwell Road, written up in his handwriting:—"Euphrasia alpina, parva, luteis floribus. Bauh: pin: 233. Euphrasia minima lutea. Bocc. Mus: piante. 2. tab. 60. an varietas officinalis?"

Wettstein, in his elaborate Monograph of the genus *Euphrasia*, quoted above, states that *E. minima* belongs to the most difficult and multiform species, and is therefore by many botanists not rightly understood. He admitted that he himself was obliged for five years to study the plant in different habitats and countries before he clearly comprehended it. The difficulty consists in the fact that it varies very greatly according to the altitude of the station, and the proportion of snow thereon, as well as the amount of exposure; the colour of the flowers and the degree of hairiness also fluctuate considerably; and the small size of the plant causes herbarium-material to be often unsatisfactory for use.

The height of the stem ranges from 0·5 cm. in snowy habitats to 25 cm. on rich soils and in the more southern regions.

In this, as well as in some other species, it appears, after careful investigations, that differences in anatomical structure may be much greater than those attributed to distinct species.

In the eastern parts of the alpine area of distribution the form *pallida* predominates, whereas in the southern parts the forms *bicolor* and *flava* prevail; but not rarely forms with different colours are intermixed. Seedlings generally produce flowers of the same colour as that of the plant which produced the seeds. In 1894 Wettstein, from the seeds of one individual specimen of *E. minima* forma *flava*, raised fourteen quite like-flowered seedlings, and from the seeds of one specimen of f. *bicolor* he obtained nine individuals with flowers of a perfectly similar colouring.

There is some reason for the suggestion, as the result of numerous observations, that the fundamental type of the species represents the forms *flava* and *bicolor*, and that the form *pallida*, at least in the Alps, shows the first influence of crossing; for where f. *pallida* is frequent, other white-flowered species in the neighbourhood were observed to be still more abundant, and f. *pallida* has often comparatively large flowers; also, while in the regions where *E. minima* is rare and grows in company with other species, specimens of f. *pallida* were observed to predominate. At the same time it may not be safe definitely to pronounce *E. minima* f. *pallida* to be a hybrid. The flowers of *E. minima* are known to be visited by flies (Diptera) and butterflies (Lepidoptera).

The species is found to thrive as a half-parasite on the roots of the grass *Poa nemoralis* L.

The following is a particular account, taken from fresh or recent specimens of the yellow-flowered eyebright, as it grows in short turf on the high and comparatively dry table-lands and gentle slopes of exposed Exmoor :—

Euphrasia minima.

An annual herb, a half-parasite on the rootlets of grass, 2–15 cm. high above the ground, minutely sessile-glandular, puberulous or pubescent with whitish deflected curly rather thick and (except sometimes on the calyx) not gland-tipped hairs, dull green, staining water with a chlorine-yellowish colour, gregarious; root tapering downwards, flexuous, branched, the branches whitish or brownish, fibrillous, the fibrils often bearing on their sides and tips numerous very small dilated roundish nodules (haustoria); stems slender or below moderately robust, rather rigid, more or less branched especially about the lower half or simple, erect or ascending, often shortly decumbent at the base, leafy and terete below, above by degrees bluntly angular or slightly compressed, frequently purplish; branches spreading, ascending or nearly erect, numerous or few, sometimes again branched, opposite or alternate, more or less leafy; stem-leaves opposite subopposite or the upper ones as well as the uppermost ones (bracts) alternate, ovate or the lower ones obovate, somewhat concave, slightly glossy, strongly toothed except the very obtuse lowermost pair, obtuse or the upper ones acute at the apex, at the base the lower ones wedge-shaped the upper and mid ones obtuse at the sessile or subsessile base or shortly petiolant, dull green, rather thickly herbaceous,

minutely sessile-glandular, more or less hispidulous at least beneath along the midrib and often on the margin with short scattered pallid not gland-tipped hairs, patulous or the upper ones subadpressed, 1–6 mm. long, 0·5–7 mm. broad including the teeth, excluding the teeth ranging up to 3 mm. in breadth, the lowest ones small, the margin shortly revolute-thickened, the midrib thickened beneath, the lateral veins also somewhat thickened beneath and proceeding from near the base of the leaf, or in the case of the uppermost veins from the upper part of the midrib to the base of the notch between the teeth, net-veins inconspicuous, teeth 1–3 on each side (or the basal leaves entire), obtuse acute or especially the lower ones sometime caudate-acuminate, ranging up to 2 mm. long; floral leaves (bracts) like the upper stem-leaves, sometimes rather obovate, broad-based, sessile, without gland-tipped setæ, about 4 mm. long, with acute teeth, concave; stipules 0; internodes variable in length, the lower ones often exceeding the leaves, the upper ones shorter; flowers protogynous, axillary, subsessile, numerous, 4·5–7 mm. long, together forming spike-like leafy erect or ascending lengthening centripetal often somewhat interrupted inflorescences which at length occupy the greater part of the stem or branch; calyx inferior, somewhat obliquely campanulate or campanulate-oblong, subcompressed, somewhat narrowed towards the base, laterally sub-bilabiate, more or less closely embraced on the outer side by the floral leaves (bracts) in the axils of which the flowers are inserted, 4-cleft, 4-nerved, minutely sessile-glandular, more or less hispidulous with scattered pallid hairs and sometimes with very short gland-tipped setæ or nearly glabrate, persistent, not or scarcely accrescent, 4–5 mm. long, chartaceous, chlorine-green on the margin and nerves; the lobes lanceolate or ovate-lanceolate, uninerved, very acute or acuminate, 2–3 mm. long; corolla bilabiate, ringent, firmly membranous, lemon-coloured or partly almost orange-yellow, sometimes the upper lip bluish-purplish and one or both lips marked with dark bluish lines, tardily deciduous; the tube straight, 2·5–4 mm. long, 1 mm. broad at the base, funnel-shaped above, puberulous outside towards the top, yellow or above orange-yellow in front or sometimes above purplish, delicately marked with fifteen longitudinal nerves, within glabrous except the sparingly pilose throat, not elongating during the flowering; the upper lip erect, bifid, galeate, pilosulous outside, 2–3 mm. long, the lobes rounded, emarginate, 0·5 mm. long; the lower lip spreading, 3-lobed, puberulous outside, 3–4 mm. long, the lobes obtusely ovate, emarginate, 1·5–2 mm. long; stamens 4, didynamous; filaments filiform, somewhat compressed, slightly tapering upwards, yellowish or below somewhat orange-yellow, nearly glabrous; the shorter pair about 1 mm. long and inserted on the corolla-tube below the lower lip, the longer pair about 1·5 mm. long and inserted on the corolla-tube below the upper lip; anthers connivent under the sheltering upper lip of the corolla, ovate-rotund, violet-coloured or in the dry state dark-purple, versatile, incumbent, distinctly and somewhat unequally 2-celled, about 0·8 mm. long, the cells parallel, ciliate with whitish

hispid hairs along the lines of dehiscence, otherwise glabrous, one of the cells calcarate at the base with a long slender whitish spur, the other cell shortly or very shortly mucronate at the base; pollen globose or spheroidal, cerebriformly convolute when dry, about 43 μ diam.; ovary wholly superior, oval, obtuse at both ends, sessile, subcompressed, glabrous below, pilose on the upper half with pallid erect hairs, equally 2-celled, 1·2 mm. long, 0·8 mm. broad; style slender, glabrous below, puberulous on the upper part, viscid and rounded at the small capitate stigmatic vertex, curved more or less in the upper part under the upper lip of the corolla, at length by the curvature bringing the stigma down to or a little below the anthers, 5–6 mm. long; capsule obovoid or oval-oblong, slightly compressed broadly emarginate at the apex, broadly rounded at the sessile base; minutely puberulous below, towards the apex pilose with rather long erect or suberect hairs, loculicidally bi-valved, equalling or a little shorter than the calyx, 3·5–4·6 mm. long, about 1·5–1·6 mm. broad; seeds pendulous, about four in each cell of the capsule or fewer, ovoid-oblong, glabrous, marked with about twelve elevated longitudinal ribs and with drab or dusky-brown interspaces, irregularly three-sided, two of the sides nearly plane and the third the broadest and curved, about 1·4–1·5 mm. long, and 0·5–0·6 mm. broad, slightly narrowed towards the vertex and subappendiculate at the base; albumen pallid, succulent-pulpy; embryo placed along the middle of the albumen, narrowly cylindrical but slightly curved, subterete, whitish, 0·9 mm. long, 0·3 mm. broad; cotyledons 2, about as broad as long; radicle nearly as broad as the cotyledons.

The pollen is mealy, fairly copious, the grains mostly subglobose, but some of them are spheroidal. When treated with a 25 per cent. solution of chloral-hydrate, the convolutions mostly disappear; one grain, measured by means of a micrometer, was found to be 43 μ broad and 46 μ long.

Accompanying the yellow-flowered *Euphrasia*, as described above, there grew in greater abundance specimens having whitish or pale-purplish or purplish flowers, but in other respects scarcely differing.

Whether our English plant should be considered a new form of *E. minima* will depend upon further investigation to test the persistency of some small points of divergence.

Wettstein, in his Monograph, includes in the description of the corolla of *E. minima* and its varieties and forms numerous diversities and mixtures of colours; he gives the time of flowering as from July to September.

The haustoria rest upon the rootlets of the grass which serves as the host, and do not encompass them. The absorption-cells are very short, and only just penetrate into the host; the vascular bundle is entirely wanting within the sucker, or its place is taken by a single and comparatively large vessel. The grasses on the rootlets of which the haustoria fasten their suckers suffer no apparent injury as a consequence of this connection. The rootlet organically united to the sucker dies away in autumn, but the

eyebright also withers at that season, and, as has been ascertained in the case of some other plants, it may be conceived that the useful substances existing in the green leaves of the eyebright may be transferred, shortly before the latter withers, to the host-plant and deposited there at a convenient time in the permanent part of the root as reserve-material, and in this way the host-plant may ultimately derive benefit from the so-called parasite: see Kerner & Oliver, Nat. Hist. Pl. i. pp. 178, 243 (1903).

In order to test the time for the germination of the seeds, Wettstein (Mon. p. 26) collected seeds of *E. minima* var. *hispidula* in the Tirol on 15 August 1893; he sowed them on 10 October 1893 in a box which had been a month earlier prepared and sown with grass-seeds, and he found that the former seeds germinated on 18 March 1894. Similarly he sowed seeds of *E. minima* var. *Schleicheri* on the same date, and they germinated on 16 March 1894. Seeds of *E. minima*, sown on 28 January 1894, germinated on 25 March 1894. Seeds of var. *Schleicheri*, collected in Switzerland in August 1893 and similarly sown on 28 January 1894, germinated on 26 March 1894. Corresponding experiments made with the seeds of *E. Rostkoviana* Hayne, and also with *E. salisburgensis* Funck, produced nearly like results.

E. minima Jacq. belongs to the section *Eu-euphrasia*, to the subsection *Semicalcaratæ*, and to the group *Parifloræ*; among British species it should be placed between *E. gracilis* Fries and *E. scottica* Wettst.

Its characters differ from those of *E. brevipila* Burnat & Gremli by not having short glanduliferous hairs on the leaves, and usually by the colour of the corollas, 4·5–6 instead of 6–10 mm. long.

From *E. nemorosa* Pers. it differs by the less-branched and more hairy stems, by the normally obtuse leaves, and in most cases by the colour of the flowers.

From *E. curta* Wettst. it is stated to differ by the longer capsules, and chiefly by the colour of the flowers.

From *E. gracilis* Fries it differs by the leaves, at least on the margin and lower face, being finely hispid, and by the colour of the flowers.

From *E. scottica* Wettst. it differs, if at all, by the length and shape of the capsules, obovoid or oval-oblong instead of oblong, and by the colour of the flowers.

From *E. Vigursii* F. H. Davey it differs by the absolute or comparative absence of gland-tipped hairs, and by the smaller size and colour of the flowers.

From *E. montana* Jord. it differs by the general absence of gland-tipped hairs, and by the smaller size and colour of the flowers.

Wettstein describes and names five hybrids between *E. minima* and other species, one of which is a cross with a species reported to occur in Britain, namely, *Euphrasia salisburgensis* × *E. minima* = *E. Jaeggii* Wettst. = *E. minima* × *salisburgensis* Jaeggi = *? E. salisburgensis* var. *aurea* Boullu. This hybrid is said to differ

from *E. salisburgensis* Funck by shorter somewhat obtusely dentate and rather setulose leaves and by shorter and rather ciliate capsules; and from *E. minima* Jacq. by longer and narrower leaves and less ciliate capsules. It has occurred both in Switzerland and the Tirol; R. Chodat again met with it in the former country, in the Canton of Vaud, where he reported that one of the charms of those high regions is the abundance of this hybrid, which is nearly as plentiful as its parents in the stations where both of them are found.

Since the above was set up in type, Mr. F. N. Williams has drawn my attention to an important paper by M. Alfred Chabert, "Les *Euphrasia* de la France," in *Bulletin de l'Herbier Boissier*, sér. 2, ii. pp. 121–152 (February, 1902). In this paper only three species are admitted for France, namely, *E. minima* Jacq., *E. hirtella* Jord., and *E. Rostkoviana* Hayne; but numerous forms and varieties of each of them are added. The account of *E. minima* is given on pages 136–143. *E. minima drosocalyx* A. Chab. was kept up as a species by Wettstein, Monogr., p. 167, under the name of *E. drosocalyx* Freyn; *E. minima gymnanthera* A. Chab. is a new variety, the chief character of which is the completely glabrous condition of the anthers; *E. minima capitulata* A. Chab. is founded on *E. capitulata* Towns., which was quoted by Wettstein as a synonym of *E. drosocalyx* Freyn; and *E. minima Willkommii* A. Chab. is *E. minima* Willk. & Lange, Prodr. Fl. Hispan. ii. p. 619 (1870) partly, and the same as *E. Willkommii* Freyn. *E. javalambrensis* Pau, Not. Bot. Fl. Esp. ii. p. 33 (1889), which Wettstein on the authority of Willkomm doubtfully referred to *E. minima* Chabert, who has seen original specimens from Pau preserved in the Giraudias herbarium, says belongs to *E. hirtella*.

It appears that the parasitism of *E. minima* on the grass "*Festuca violacea*" has been proved.

Explanation of Plate 497A.

Euphrasia minima Jacq. 1*a*. Plant, natural size, simple. 1*b*. A branched specimen, natural size. 2. A lower stem-leaf, × 5. 3. A mid stem-leaf, × 5. 4. An upper stem-leaf, × 5. 5 and 6. Floral leaves (bracts). 7. A detached flower, side view, × 5. 8. A fruit, with bract, front view, × 5. 9. The same, lateral view, × 4.

CORNWALL AND DEVON PLANT-NOTES, 1908.

By Rev. W. Moyle Rogers, F.L.S.

I botanized in West Cornwall and South Devon last summer through July and the first few days of August, and I give the following notes as the chief result of what I saw. In W. Cornwall I stayed in Newquay, and seldom got more than six or eight miles beyond that place; almost wholly under the guidance of Dr. C. C. Vigurs. On three occasions, however, I reached a few miles further to the south-west, beyond Goonhavern and Perran-

porth, in the large parish of Perranzabuloe, with Mr. W. Tresidder as my guide. Without the help of these two experienced local botanists my Cornish record must have been meagre indeed, as the weather during my three weeks' stay in their neighbourhood was broken, and it was too early in the season for satisfactory work at Rubi. They have, however, kindly allowed me to supplement my own list by the addition of several interesting Rubi collected by them and sent to me since my visit. Their initials ("W. T." or "C. C. V.") will be found attached to these.

In S. Devon I had no such help, and my work was confined to the immediate neighbourhood of Okehampton and a small district to the south-east of that town, taking in Belstone, Sticklepath, and a very small part of the parishes of South Tawton and South Zeal, near Sticklepath, along the edge of Dartmoor. But here I had the great advantage of unbroken fine weather and a more advanced season for the Rubi, which are remarkably abundant up to about 1000 ft. above sea-level, and of exceptional interest.

The Cornish localities are additional to those hitherto published by Mr. F. H. Davey, except in a few obvious instances where a further notice seemed possibly desirable. The Devon localities are all additional to those found in *Flora Devoniensis* and Mr. Ravenshaw's *Flowering Plants and Ferns of Devonshire*. An asterisk is prefixed to my few new vice-county records, and a dagger to denizens and aliens. "(C)" stands for Cornwall West (*Top. Bot.* v.-c. 1), and "(D)" for Devon South (v.-c. 3).

Ranunculus Lenormandi F. Schultz. (D). Frequent in the valley of the Upper Taw at Belstone.—†*Hesperis matronalis* Linn. (C). Trewerry, by the railroad; several plants. — †*Erysimum cheiranthoides* Linn. (D). South Tawton, near Sticklepath Bridge; garden weed. — *Diplotaxis muralis* DC. var. *Babingtonii* Syme. (C). Perranporth. — *Teesdalia nudicaulis* Br. (D). Edge of the moor at Belstone, and between it and Sticklepath. — *Raphanus maritimus* Sm. (C). Remarkably luxuriant and abundant along the coast, and extending inland at Newquay and Perranporth.

Polygala oxyptera Reichb. (C). Trewerry, by railroad; very weak. (D). Hillside above Okehampton Railway Station.—*Geranium pusillum* Linn. (D). Sticklepath. — *Rhamnus Frangula* Linn. (C). Penhallow Moor; pointed out by Dr. Vigurs as uncommon in the district, though Mr. Davey tells me that it is "frequent in the wooded parts of Cornwall." (D). S. Tawton, frequent.—†*Melilotus indica* All. (C). By Quintrell Downs; one plant. — *Trifolium striatum* Linn. (C). Between Newquay and Porth.

Rubus suberectus Anders. (D). By R. Taw at Sticklepath.—*R. plicatus* Wh. & N. (C). Goss Moor; *C. C. V.*! (D). Near Okehampton. — *R. nitidus* Wh. & N. var. *opacus* (Focke) f. *minor*. (D). Locally abundant and identical with the plant of the Plymouth neighbourhood thus named by Dr. Focke. Okehampton Hill (above station). White Rock Hill, Sticklepath.

S. Tawton.—*R. affinis* Wh. & N. (D). S. Tawton, about half a mile to the east of Sticklepath Bridge.—Var. *Briggsianus* Rogers. (C). Goonhavern. Newlyn Downs; *C. C. V.*! (D). Okehampton. Belstone. White Rock Hill, Sticklepath.—**R. cariensis* Genev. (D). Okehampton Hill, frequent.—**R. latifolius* Bab. (C). Goonhavern to Penhallick Water, roadside ditches. Wheal Hope Lane and elsewhere, Perranzabuloe. Tregarthen Bottoms, Kenwyn; *W. T.*! There can be no doubt, I think, as to the correctness of the name, though I know of no previous record for any county south of Monmouth and Bucks.—*R. imbricatus* Hort. (D). Okehampton; Sticklepath; S. Tawton. Quite typical and fairly frequent.—*R. incurvatus* Bab. (C). Quintrell Downs; Goonhaven. Marsanrose, St. Allen; *W. T.*! Very luxuriant, and apparently identical with type, except in the more whitish felt on the under surface of the slightly thinner leaves. First collected in the county in 1907 by Mr. Tresidder at Perranwell, below Truro. *(D). Belstone; Sticklepath; S. Tawton; S. Zeal. Very like the Cornish plant.—*R. Lindleianus* Lees. (C). Penhallow Moor, one bush. Apparently uncommon in West Cornwall. (D). Frequent near Okehampton and along the edge of the moor.—*R. argenteus* Wh. & N. (C). Very common. After *R. rusticanus* probably the most abundant bramble in West Cornwall, and always the eglandular form described by Mr. Briggs as *R. erythrinus* Genev. in this Journal, 1890, 204 (cf. *Journ. Bot.* 1905, 200). Very conspicuous from its numerous tall pink-flowered panicles and rather pale bright green foliage. (D). Common.—*R. rhamnifolius* Wh. & N. (D). Near Okehampton, Belstone, and S. Tawton, but in no great quantity. Not seen in Cornwall this year.—*R. nemoralis* P. J. Muell. (C). In two forms:—(1) Type. Quintrell Downs; Newquay and Bodmin Road. Goss Moor, Ilquin; *C. C. V.*! (2) Form with leaflets greenish white-felted beneath smaller and more irregularly toothed towards the point, and narrower more elongate and somewhat glandular panicle. Rather common and locally abundant. Quintrell Downs; Penhallow Moor; near Benny Bridge, Newlyn; Goonhavern; Perranporth; Scorrier. Goss Moor, Par; *C. C. V.*! This form is connected with type by an intermediate plant, which occurs in some quantity at Mullion and on the Goonhilly Downs in the Lizard district. I have not seen any Devon specimens of *R. nemoralis*.—*R. dumnoniensis* Bab. Frequent. (C). Coswarth Downs; Quintrell; Penhallow Moor; Goonhavern. (D). Okehampton; Belstone; Sticklepath; S. Zeal. Stem usually not so high-arching as in most of the group, but remarkably long, stout, furrowed, and prickly. Not averse to windswept spots, where its large panicles of handsome white flowers make it very conspicuous.—*R. pulcherrimus* Neum. Common.—*R. Selmeri* Lindeb. (D). Okehampton and Belstone, fairly frequent.—*R. ramosus* Briggs. (C). Penhallick Water; *W. T.*!—*R. thyrsoideus* Wimm., sp. coll. I think it best to place here two forms, which may perhaps be rather allied to this species than actually belonging to it. (1) Form with leaves having greenish-white felt on the under surface and a strongly branched

panicle. (C). Goonhavern to Penhallick Water. Not seen in any other locality this year, but in 1904 observed in considerable quantity on the Lizard Peninsula. I also have Pembrokeshire specimens of it. (2) Form closely approaching the Continental *R. candicans* Weihe. (D). Okehampton Park, by R. Okement.—*R. Godroni* Lec. & Lam. (C). Fairly frequent, but variable. (D). Uncommon. Belstone; White Rock Hill, Sticklepath; S. Tawton. — *R. rusticanus* Merc. (C). Apparently the most common bramble. (D). Common. — *R. silvaticus* Wh. & N. (C). Goss Moor; *C. C. V.*! (D). Belstone and Sticklepath, locally abundant. Growing luxuriantly in exposed spots, and not so hairy or greyish as usual.—*R. lentiginosus* Lees. (D). S. Tawton, local. — *R. macrophyllus* Wh. & N. Apparently rare. (C). Penhallick Water; *W. T.*! (D). Belstone, by R. Taw.—Var. *Schlechtendalii* (Weihe). (D). Locally abundant. A strong and very hairy form. Okehampton; Belstone; Sticklepath; S. Tawton; S. Zeal.—*R. Sprengelii* Weihe. (D). Common, especially at Belstone.—*R. hypoleucus* Lefv. & Muell. (C). Strong and characteristic. Quintrell; Newlyn; Goonhavern; Perranporth; Scorrier. Goss Moor; *C. C. V.*! Kenwyn; *W. T.*!—*R. hirtifolius* Muell. & Wirtg. var. *mollissimus* (Rogers). (D). Sticklepath; S. Zeal.—*R. iricus* Rogers. (C). Polgoda, Goonhavern. Tregarthen Bottoms, Kenwyn; *W. T.*! Sent to me by Mr. Tresidder from several Perranzabuloe localities in 1907.—*R. pyramidalis* Kalt. (C). Newquay and Bodmin Road. (D). Frequent, but rather variable.—*R. leucostachys* Sm. Common. — Var. *gymnostachys* (Genev.). (D). S. Zeal. — *R. lasioclados* Focke var. *angustifolius* Rogers. (C). Perranporth. Near *R. argyranthus* Bill. & Luc. (C). Quintrell Downs, east of railway-bridge. Indistinguishable, I think, from Channel Island plants similarly named for me by Dr. Focke in 1897. — *R. anglosaxonicus* Gelert var. *curvidens* Ley. *(D). Quarry, Okehampton. Accepted as his type by Mr. Ley; as is also an *East Cornwall specimen collected by Dr. Vigurs at Rosewarrick, Lanivet in 1905. — *R. uncinatus* P. J. Muell. *(D). Hill above Okehampton Station. — *R. Borreri* Bell Salt. (D). Hill above Okehampton Station; Belstone to Sticklepath, local. — Var. *dentatifolius* Briggs. (C). Quintrell and Coswarth Downs; apparently a very weak form of this. (D). Frequent and characteristic; Okehampton Hill; Belstone; Sticklepath; S. Tawton.—*R. radula* Weihe. (C). Coswarth Down, a form with only slight glandular development and rather narrow leaflets. — Var. *anglicanus* Rogers. (C). Goonhavern. (D). Belstone; S. Tawton. Fairly frequent and quite characteristic. — *R. oigocladus* Muell. & Lefv. (C). Between Goonhavern and Penhallick Water. "Fourmile stone," Kenwyn; *W. T.*! Mr. Tresidder also finds on Polgoda Downs, Perranzabuloe, a form with more strongly developed panicle, which must either go here or under *R. botryeros* Focke; and the same may be said of a plant I found in small quantity on (D) White Rock Hill, Sticklepath.—*R. pallidus* Wh. & N., forma. (D). Okehampton Park; a remarkable plant, very slender and

weakly armed, with large deeply-cut leaves and bright pink flowers, growing in tangled masses under trees on a steep hillside.—*R. scaber* Wh. & N. *(C). Goonhavern to Penhallick Water, for a short distance in the broad ditches on both sides of the road. Apparently a forma *angustifolia* of this species.—*R. thyrsiger* Bab. (D). Quarry, Okehampton.—*R. rosaceus* Wh. & N. var. *hystrix* (Wh. & N.). (D). Okehampton; S. Tawton.—Var. *infecundus* Rogers. (C). Newquay and Bodmin Road.—*R. plinthostylus* Genev. (C). Quite common, and, as a rule, easily recognizable, though varying considerably in stoutness and in the character of the armature, according to situation. It seems to be far the most generally distributed of the Cornish glandular brambles, although as yet unknown elsewhere in Britain, except in one locality in Dorset and one in West Gloucester. Usually conspicuous by its leafy lax panicle of rather small pinkish star-like flowers, and its handsome deeply incised leaflets narrowed at both ends. Dr. Vigurs finds that its fruit is abundant and well-flavoured. Further observation has confirmed me in the view that this plant is at least as near to *R. mutabilis* as to *R. Koehleri*.—*R. hirtus* Waldst. & Kit. var. *rotundifolius* Bab. (D). Okehampton; Sticklepath; S. Tawton. Locally abundant and identical with the plant so common in the Teign Valley.—*R. corylifolius* Sm. Quite uncommon. (*a*) *sublustris* (Lees). (C). Quintreil Downs. (*b*) *cyclophyllus* (Lindeb.). (C). Coswarth Downs; Goonhavern.—*R. cæsius* Linn. (C). Common at and near the coast, and there chiefly a rather stout large-flowered form or hybrid. Also at Goonhavern and Trewerry. Near Perranporth Mr. Tresidder showed me an abundant form with monstrous flowers, and otherwise making some approach towards *R. Balfourianus*, if it is not actually an abnormal state or form of that species.

Alchemilla vulgaris Linn. var. *pratensis* Pohl. (D). Edge of moor, Belstone.—*Poterium Sanguisorba* Linn. (C). Newquay; Perran porth.—*P. officinale* A. Gray. D. Okehampton.—*Rosa micrantha* Sm. (C). Goonhavern; Perranporth.—*R. canina* Linn, (C). The varieties *lutetiana* and *dumalis* only moderately frequent, and none others observed.—*R. systyla* Bast. (D). S. Tawton. Not seen in (C), and as yet known only in the eastern vice-county.—*R. arvensis* Huds. C). The most common rose. (D). Frequent.

Epilobium lanceolatum Seb. & Maur. (D). Hill above Okehampton Railway Station.—*Fœniculum vulgare* Mill. (C). Newquay; Goonhavern; Perranporth, very strong and abundant. I agree with Dr. Vigurs and Mr. Tresidder in thinking this native, as, I see, it is regarded in *Lond. Cat.* ed. x.—*Caucalis nodosa* Scop. (C). Particularly common throughout the district.—*Rubia peregrina* Linn. (C). The Gannel, Newquay; Goonhavern.—*Galium Mollugo* Linn. (C) and (D). Exceedingly common. On Mount Wise, Newquay, I saw it at intervals (with the ordinary white-flowered form growing between), several plants bearing small straw-coloured flowers, but in no other respect that I could detect

intermediate between this species and *G. verum* Linn., which was abundant in neighbouring fields.

Arctium majus Bernh. (C). Trewerry, field near railway "halt"; near Newquay. Previously discovered in the district by Dr. Vigurs, but not recorded for W. Cornwall in *Top. Bot.*— *A. minus* Bernh. (C). Trewerry. (D). Belstone; S. Tawton.— *A. nemorosum* Lej. ? (D). Belstone; S. Tawton.—*Picris hieracioides* Linn. (C). Trenance, Newquay; narrow deep lane.— *P. echioides* Linn. (C). Newquay neighbourhood, frequent.— †*Crepis taraxacifolia* Thuill. (C). Newquay, waste ground, Mount Wise.—*Hieracium umbellatum* Linn. (D). Frequent. Okehampton; Sticklepath; S. Tawton.— *Wahlenbergia hederacea* Reichb. (D). Exceedingly common in the valley of the Upper Taw, and in the marshy ground by the mines at South Zeal.—*Erica ciliaris* Linn. (C). Seen in abundance under Dr. Vigurs's guidance at Penhallow Moor.—*Microcala filiformis* Hoffmgg. & Link. (C). Quintrell Downs.—*Anchusa sempervirens* Linn. (C). A well-established denizen in the Newquay neighbourbood, as in many parts of Cornwall and Devon.

Myosotis repens G. & D. Don. (C). Penhallow Moor and neighbourhood, in great quantity. Apparently the prevailing water forget-me-not of the district, as was to have been expected. (D). Belstone neighbourhood, abundant.—*Lithospermum officinale* Linn. C). Perranporth; near Newquay.

Linaria repens Linn. (D). About half a mile from Belstone, on the Okehampton Road, in fair quantity for one hundred yards or more; apparently native. Belstone village, where it may have been planted.—*Scrophularia Scorodonia* Linn. (C). Remarkably common in the immediate neighbourhood of Newquay, where (as Dr. Vigurs pointed out to me) it is the prevailing dry land figwort, *S. nodosa* Linn. being rare.— †*Mimulus moschatus* Dougl. (D). S. Tawton, in mid-stream near the Sticklepath Bridge. Seen only from the bank of the river; one clump, in flower.—*Bartsia viscosa* Linn. (C). Locally common. Quintrell Downs; Penhallow Moor; Trewerry.—*Verbena officinalis* Linn. (C). Unusually frequent throughout the district.— *Mentha longifolia* Huds. (D). Sticklepath.— *M. piperita* Linn. (C). Quintrell Downs. (D). Sticklepath.

Rumex pulcher Linn. (C). On coast, locally abundant. Newquay; Fistral Bay; Perranporth.— *Orchis ericetorum* Linton. (C). Penhallow Moor; Quintrell Downs.—*Scirpus compressus* Pers. (C). Perranporth.—*Carex helodes* Link. (C). Near Benny Bridge. (D). Okehampton.— *Gastridium lendigerum* Gaud. (C). Near Goonhavern, where it has been known by Mr. Tresidder for some years.—*Asplenium lanceolatum* Huds. (D). Valley of the Upper Taw, between Belstone and Sticklepath.

BRYOPHYTES OF SOMERSETSHIRE.

By W. Watson and W. Ingham.

The vice-counties of North and South Somerset are very poorly represented in the Hepatic Census Catalogue of 1905, and though North Somerset (v.-c. 6) had a large number of mosses assigned to it in the Moss Census Catalogue of 1907, South Somerset (v.-c. 5) was very inadequately represented. This paucity was not due to any scarcity of bryophytes, but to a lack of workers in this particular branch of field botany.

The county is one of the richest in England in regard to its bryophytic flora, its trees, rocks, and soil being richly coloured with the varying tints of its bryophytic representatives. We have done some work to remedy the deficiency, and the following list chiefly consists of new records for the county. In a few cases records are also given for the neighbouring vice-counties of South Wiltshire (v.-c. 8) and North Devon (v.-c. 4). The bracketed numbers indicate the vice-county in which the locality given is situated.

Musci.

Polytrichum juniperinum Willd. Minehead (5). Cothelstone (5).

Campylopus pyriformis Brid. Minehead (5).—*C. fragilis* B. & S. Minehead (5).

Fissidens viridulus Wahl. Taunton (5).—*F. bryoides* Hedw. Taunton (5). Cothelstone (5). The form *inconstans* (*F. inconstans* Schimp.) is found in both vice-counties. Bruton (6). Stoke St. Mary's (5).

Tortula ambigua Angstr. Taunton (5).—*T. subulata* Hedw. Near Taunton (5).—*T. lævipila* Schwaeg. var. *lævipilæformis* Limpr. West Monkton (5).—*T. papillosa* Wils. Norton Fitzwarren (5).

Barbula fallax Hedw. Common. Minehead (5). Taunton (5). Timberscombe (5). Cothelstone (5).—*B. Hornschuchiana* Schultz. Cothelstone (5).

Weisia viridula Hedw. Taunton (5).

Orthotrichum anomalum Hedw. var. *saxatile* Milde. Taunton (5).—*O. affine* Schrad. Common in Taunton district (5).

Schistostega osmundacea Mohr. West Monkton (5).

Aulacomnium androgynum Schwaeg. Minehead (5).

Webera annotina Schwaeg. West Monkton (5). Broomfield (5).—*W. albicans* Schimp. Norton Fitzwarren (5). Frequent in Taunton district (5).

Bryum cæspiticium L. Taunton (5).—*B. Donianum* Grev. Toulton (5). Cothelstone (5).—*B. erythrocarpum* Schwaeg. Pitminster (5). Kingston (5).—*B. murale* Wils. Bishop's Lydeard (5).

Mnium affine Bland. Frequent in Taunton district (5).—*M. rostratum* Schrad. Pitminster, near Taunton (5).—*M. stellare* Reich. Near Culmhead (5).

Leskea polycarpa Ehrh. Norton Fitzwarren (5).

Camptothecium lutescens B. & S. Pickeridge (5).

Brachythecium velutinum B. & S. Common in Taunton district (5).—*B. rutabulum* B. & S. The form *robustum* (var. *robustum* Schimp.) is frequent in both vice-counties. Bruton (6). Cothelstone (5).—*B. cæspitosum* Dixon. Cheddon Fitzpaine (5).—*B. illecebrum* De Not. Hestercombe (5). Cothelstone (5).

Eurynchium Swartzii Hobk. Norton Fitzwarren (5).—*E. pumilum* Schimp. Common in Taunton district (5).—*E. confertum* Milde. Near Wincanton (5).

Plagiothecium silvaticum B. & S. Common. Minehead (5). Cothelstone (5). Blackdowns (5). Taunton (5).

Hypnum riparium L. var. *subsecundum* Schimp. Norton Fitzwarren (5).—*H. riparium* L. var. *longifolium* Schimp. Bruton (6), Shapwick (6). A distant leaved form of this variety. Bruton (6).—*H. aduncum* Hedw. *non* L. var. *intermedium* Schimp. North Curry (5). — Var. *paternum* Sanio. Norton Fitzwarren (5). — *H. molluscum* Hedw. Common in the woods of the Blackdowns (5).—*H. cupressiforme* L. var. *ericetorum* B. & S. Stourton Woods (8).—Var. *tectorum* Brid. Bruton (6). Taunton (5).

Hepaticæ.

Conocephalum conicum (L.) Dum. Common in vice-counties 5, 6, and 8. Berndon (4). Bruton, &c. (6). Stourton (8). Taunton, &c. (5).

Lunularia cruciata (L.) Dum. Common in vice-counties 5, 6, and 8. Brendon (4). Bruton, &c. (6). Taunton, &c. (5). Stourton (8). Young *carpocephala* are often found. This plant appears to be truly indigenous to Somerset, and is often found growing in situations where there could be very small probability of its introduction.

Marchantia polymorpha L. Infrequent. Careford (5). Norton Fitzwarren (5). Frome (6). Brendon (4). This plant occurs both in water and on damp places. It has frequently been found on walls and roadsides, where its water supply was limited and intermittent, though Mr. H. R. Yeates (*New Phytologist*, 1908, 169) intimates otherwise.

Metzgeria furcata (L.) Lindb. Common. Norton Fitzwarren (5). Cothelstone (5). Bruton (6). Goblin Coombe (6). Brockley Coombe (6).

Pellia endivæfolia (Dicks.) Dum. Common. Brendon (4). Taunton district, &c. (5). Bruton, &c. (6). Stourton (8).—*P. epiphylla* (L.) Dum. Common. Brentford (4). Cothelstone, &c. (5). Kingsettle Hill, &c. (6). Stourton Woods (8).

Nardia scalaris (Schrad.) Gray. Near Culmhead (4). Minehead (5). Cothelstone (5). Kingsettle Hill (6). Stourton Woods (8).

Aplozia riparia (Tayl.) Dum. Kingsettle Hill (6).

Lophozia ventricosa (Dicks.) Dum. Minehead (5). Timberscombe (5).

Plagiochila asplenioides (L.). Dum. Common. Timberscombe, Cothelstone, &c. (5). Bruton, Yatton, &c. (6). Stourton Woods, &c. (8).

Lophocolea bidentata (L.) Dum. Cothelstone (5). Kingsettle

Hill (6). Stourton (8).—*L. cuspidata* Limpr. Common for both 5 and 6. Cogley Wood, Yatton, Clevedon, &c. (6).—Var. *alata* Mitt. Cogley Wood (6).—*L. heterophylla* (Schrad.) Dum. Frequent. Creech Hill, &c. (6). Cothelstone, &c. (5).—Var. *laxior* Nees. Cothelstone (5). Hestercombe (6). Bruton (5).

Cephalozia bicuspidata (L.) Dum. Very common in vice-counties 5, 6, and 8. Bruton, &c. (6). Taunton, &c. (5). Stourton, &c. (8).

Kantia Trichomanis (L.) Gray. Cogley Wood (6). Masbury (6).—*K. Sprengelii* (Mart.) Pears. Timberscombe (5). Cothelstone (5). Bruton (6).—*K. arguta* (Nees et Mont.) Lindb. Masbury (6).

Trichocolea tomentella (Ehrh.). Dum. Cogley Wood (6).

Diplophyllum albicans (L.) Dum. Timberscombe (5). Cothelstone (5). Minehead (5). Common.

Scapania compacta (Roth.) Dum. Minehead (5). Timberscombe (5).

Radula complanata (L.) Dum. Frequent in 5, 6, and 8. Creech (6). Taunton (5). Stourton Woods (8).

Madotheca platyphylla (L.) Dum. Common. Taunton (5). Bruton, Gatton, &c. (6). Stourton (8).

Lejeunea cavifolia (Ehrh.) Lindb. Goblin Coombe (6).

Marchesinia Mackaii (Hook.) Gray. Bruton (6).

Frullania Tamarisci (L.) Dum. Goblin Coombe (6).—*F. dilatata* (L.) Dum. Common. Taunton district (5). Bruton, Clevedon, and Yatton districts (6). Stourton Woods (8).

INCOMPLETE DICHOGAMY IN *ZEA MAYS*.

By Joseph Burtt-Davy, F.L.S.,
Government Agrostologist and Botanist, Transvaal.*

In Kerner and Oliver's *Natural History of Plants* (ii. 313–315) the following statements occur, which convey the impression that the Maize plant (*Zea Mays*) is protogynous :—

"As far as we can tell at present, all monœcious plants are protogynous. Sedges . . . the Maize (*Zea Mays*) . . . the Burweed . . . are all markedly protogynous. . . . The majority of diœcious plants are also protogynous. . . . These facts are of the greatest importance in the question of the significance of cross-fertilization. If the maturation of the sexes at different times had been observed only in those species of plants which bear hermaphrodite flowers, dichogamy might be recorded merely as the completion of the contrivances for preventing the pollen from fertilizing the stigmas of the same flower, *i. e.* for preventing self-fertilization or autogamy. . . . But . . . cases of complete dichogamy . . . are comparatively rare, and this explanation will not hold for the great bulk of hermaphrodite flowers which are

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* Read at a meeting of the Transvaal Biological Society, February, 1909.

incompletely dichogamous. Still less will it apply to monœcious and diœcious plants. Here there is no question of autogamy or self-fertilization, and for this reason all hypotheses founded on the prevention of self-fertilization by dichogamy are futile.

"We cannot suppose, however, since the non-simultaneous maturation of the sexes is a phenomenon which occurs in most—perhaps in all—plants, that this contrivance has no meaning. . . . Incomplete dichogamy promotes hybridization in the first place, and then, only later, a legitimate cross-fertilization in plants with monœcious flowers.

"It is well known that all the plants of a species growing under similar external conditions do not blossom on the same day, and this fact is worth noticing in so far as it might be thought possible for the earlier plants of a species to provide pollen for the stigmas of later plants. This is certainly often the case, but it is also certain that the stigmas of the very earliest plant of a protogynous species can only be, and actually are, fertilized with pollen from another species which flowers still earlier; thus the conclusion already arrived at must remain unaltered."

I have made careful observation during the two last seasons of several hundreds of plants of Maize of many varieties and breeds in many fields and in several districts of the Transvaal. In a few instances complete protandry appears to take place, but in the majority of cases which have come under observation, the Maize plant is found to be incompletely *protandrous*, and in a few cases it is distinctly though incompletely protogynous. Kerner's first statement, quoted above, therefore needs modification. In a plot of Natal Yellow-Cross, which was in a particularly favourable condition for examination, twenty-five plants (75·75 per cent.) were distinctly protandrous to eight (24·24 per cent.) which were protogynous; the remainder in the plot were either too young or too far advanced in flowering to indicate the presence or absence of protogyny. The plot in question consisted of plants of variety *indentata*, selected from an *indentata* × *indurata* cross, in which the *indentata* form is recessive.

The numbers seem to indicate Mendelian proportions, though this may be purely accidental, especially as they are so few. It seems possible, however, that protandry may prevail in one of the two parent varieties, and protogyny in the other.

Another of the above quoted statements seems to call for comment, namely, that in monœcious and diœcious plants "there is no question of autogamy or self-fertilization, and *for this reason* hypotheses founded on the prevention of self-fertilization by dichogamy are futile"; the italics are mine. In the case of *Zea Mays*, at any rate, Kerner's premises are incorrect. The relative position of male and female inflorescences is such that, given a still morning and a plant shedding pollen at the same time that the stigmas are receptive, it can scarcely fail to be self-pollinated. Dichogamy in the Maize plant would, therefore, appear to be a distinct aid to prevention of self-pollination. The fact that both protandry and protogyny are usually incomplete does not, it seems

to me, weaken the case materially. Such an arrangement provides that at least some of the ovules will be fertilized with pollen from other plants, and the progeny of such ovules would presumably benefit the race by their greater vigour. The deteriorating influence of self-pollination is very marked in the Maize plant, and the beneficial effect of cross-pollination is also very evident.

The suggestion that incomplete dichogamy in monœcious flowers promotes *hybridization* is particularly interesting in the case of Maize, as it is generally believed to be a monotypic genus. Harshberger has produced hybrids between *Zea* and *Euchlæna*, but, as far as we are aware, *Euchlæna* is the only plant with which *Zea* has been hybridized. *Euchlæna*, also, is supposedly monotypic. It is now generally considered that the five "types" or "varieties" of Maize, respectively named *indurata*, *indentata*, *saccharata*, *tunicata*, and *inverta*, are but cultural varieties of one species, of which the original wild type is unknown. It is certain that they frequently cross and have produced many crossbred forms, several of which are now "fixed." It is possible that our five types of *Zea Mays* are really the product of hybridization, of which the original parents have been, perhaps, entirely lost.

OBSERVATIONS ON *FOSSOMBRONIA*.

By A. S. Horne, B.Sc., F.G.S.

Before Stephani's rearrangement of the species of *Fossombronia*, two British species were recognized, i. e. *Fossombronia pusilla* (L.) Dum. and *angulosa* (Dicks) Raddi. Stephani's * classification, which is based chiefly upon details of spore-sculpturing, admits of three groups, each consisting of two species:—

Spores with furcate ridges: *Fossombronia pusilla* (L.) Dum., *F. cristata* Lindb.

Spores with reticulate projections: *F. angulosa* (Dicks) Raddi, *F. Dumortieri* (H. & G.) Lindb.

Spores with papillæ: *F. Mitteni* Tyndall, *F. cæspitiformis*.

In 1869 E. M. Holmes † recorded *F. pusilla* for Devonshire. In 1875 Mitten found a specimen between Parracombe and Braunton, in North Devon, which has since been described as a new species, i. e. *F. Mitteni*.‡ Curnow § states that *F. angulosa* occurs near Penzance, in Cornwall.

In 1904 I found small quantities of *Fossombronia* on a moorland locally known as Woodbury Common, in East Devon, but was unable to identify the species. On August 15th, 1906, I found a large number of mature plants, and, in a particular spot

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* *Mém. de l'Herb. Boiss.* 1900, p. 400.
† *Scale Mosses of Devon and Cornwall.*
‡ *Journ. Bot.* 1898, p. 44.
§ *Hepaticæ of West Cornwall.*

associated with them, a few plants of *Haplomitrium Hookeri*. These Fossombronias included a single very fœtid patch without spores, plants with spores resembling those of *F. cristata*, and a series of aromatic, not appreciably fœtid plants, possessing spore-sculpturings similar to those described for *Fossombronia angulosa*, *Dumortieri*, *Crozalsii* Corb., and *Husnoti* Corb.

On Sept. 15th, 1906, near Stoke Canon, Devon, I found a number of plants which, together with plants found at Effingham, Surrey, and at Rowland's Gill, in Durham, form a second series. This series includes the species *F. pusilla* and *F. cristata* mentioned by Symers McVicar* as "occasionally found together."

The Woodbury Common plants grew chiefly upon—(*a*) fine sandy soil near to and among tufts of *Juncus bufonius* L., and associated with *Haplomitrium Hookeri* and *Aplozia crenulata*; or (*b*) exposed bare peaty channels and patches between heather clumps near *Drosera rotundifolia* L. and *longifolia* L. The Stoke Canon plants grew—(*a*) upon bare yellowish clay at the entrance to a wood associated with *Calypogeia arguta* and *Aneura ambrosioides*; (*b*) just within the wood on peaty clay; (*c*) upon stiff red clay of a cart-track in a wood, in deep shade, associated with *Pellia calycina*.

The appearance presented by the *Fossombronia* varies greatly, and depends upon the particular phase of its life cycle and upon the environment. The young plant, under favourable circumstances, forms a rosette after the fashion of *Riccia crystallina*. One of these rosettes, with branches of the fourth order, measured 25 × 20 mm. It possessed about twenty-five branches of the fourth order, and about fifty perianths with sporogonia in different stages of development. There were about one hundred pairs of fully developed functional leaves, which extended in a bridging manner from the axis. The shape and size of the leaves of both series varies considerably, those of the Woodbury Common *Fossombronia* being, on the whole, much smaller than those of the other series.

As the sporophytic phase approaches the older parts of the plant die off, and numerous plantlets are left. In the open peaty channels where the plants are scattered, the original outline may be traced. Where plants are crowded together, the appearance is different. In young stages the leaves stand subvertically upward, and give the tuft a waved appearance. Where numerous perianths are developed, the tufts are lettuce-like. The stems of plantlets growing in shade among tufts of *Juncus bufonius* frequently become aerial, without rhizoids, and bear small, strongly decurrent leaves, after the fashion of the leaves on the gemmæ-bearing shoots of *Calypogeia Trichomanis* Cord.

The Fossombronias of both series possess more or less fugitive amphigastria, but not so fugitive as those of *Pellia calycina*. They occur one to each leaf for a short distance behind the growing point. They are filamentous, and may consist of three or of

* *Journ. Bot.* 1900.

several cells in a single row, or the filament may be biseriate at the base. They differ considerably in shape and size from those of *Fossombronia angulosa*, grown in the Chelsea Physic Garden. The amphigastria in this case consist of a plate of cells with filamentous margins.

The spore-sculpturing of the Woodbury Common Fossombronias is very varied. Capsules may contain furcate (*cristata* form), reticulate, or incompletely reticulate spores. They may contain both reticulate and incompletely reticulate spores, or a mixture of the three kinds. The range in number of pits on the spores within a given capsule containing reticulate spores varied as follows :—

36–14	28–18	24–12
34–22	26–14	22–9
32–16	25–15	22–8
30–18	24–14	

These spore* ranges include those described or figured for *Fossombronia angulosa* and *F. Dumortieri*, and may include that of *F. Crozalsii*.

The margins of the spores were membranous, submembranous, or ragged. These three conditions were found in the same capsule, or, one or the other, was more or less characteristic of a given capsule.

The range in number of ridges (counted under similar conditions) on the spores of different capsules of the Fossombronias with furcate spores varied as follows :—

16–22 (range described for *F. pusilla*).
18–22 Effingham.
18–26 Stoke Canon.
24–30 Effingham.
28–36 (range described for *F. cristata*).
34–42 Stoke Canon.
36–46 Stoke Canon.

The general similarity in form of the Fossombronias considered here, their life cycle, their monoicism, the possession of filamentous amphigastria, and the variation in spore decoration, suggest that we are dealing with a group of very closely related forms, which it would be extremely difficult to isolate. This group includes the forms known as *F. pusilla* and *F. cristata*. *F. angulosa* differs from these in the form of its amphigastria and in its dioicism. Two forms have been described in France by Corbière† which might throw some light on the Woodbury Common plants. The spores of *F. Husnoti* Corb. are described as being incompletely reticulate, but with marginal teeth similar to those of *F. cæspitiformis*. The spores of *F. Crozalsii* are described as having more pits than those of *F. Dumortieri*, whilst the plant has the habit of *F. cæspitiformis*.

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* Countings were made of all the pits that could be seen on looking down upon the top of the spore. Systematists generally count the number of complete pits visible.

† *Revue Bryologique*, 1903.

WATSON EXCHANGE CLUB REPORT, 1907–8.

[The Report of the Watson Exchange Club for 1907–8 contains portraits of the Rev. W. R. Linton (1901) and of Alexander Somerville (1904), the former Treasurer of the Club. The Report is largely occupied with notes on critical genera and species; those on *Rosa*, by Mr. W. Barclay and Major Wolley-Dod, seem of special interest; those on *Hieracium* show the usual proportion of doubts and difficulties, the latter increased in some cases by the "ill-prepared" and "poor material" sent in. We note that Mr. Ewing contributes notes on *Carex* identical with those from his pen which appear in the B. E. C. Report; surely this duplication of publication is neither necessary nor desirable? We are glad, however, to note that Mr. Ewing's name—"*C. vesicaria* Linn. var. *alpigera* mihi (non Fries)," which was allowed to pass without comment in the B. E. C. R. is rightly denounced as "obviously invalid" by Mr. Marshall. It would be well, we think, if each Club would place on its Reports the exact date of publication. We extract the following notes.—Ed. Journ. Bot.]

Althæa hirsuta L. Orig. chalk downs near Reigate, Surrey, v.-c. 17. Hort. Reigate, Aug. 1907. See Journ. Bot. 1902, p. 409. It is satisfactory to be able to state that this plant still occurred in 1907. It may, also, not be out of place here to mention that since writing the note in 1902 upon *A. hirsuta*, three more scattered plants of *Salvia pratensis* have been found upon the Downs—recalling strongly the Kent station for the two species mentioned.—C. E. Salmon.

Malva moschata Linn. var. heterophylla Lej. Buckland Hill, Surrey, v.-c. 17, Sept. 1, 1907. This appears to be a smaller and more slender plant than var. *laciniata* Lej. (the common British form). French floras would call this var. *intermedia* Gren. & Godr., I understand.—C. E. Salmon.

Tilia platyphyllos Scop. Laneside, Buckland Hill, Surrey, v.-c. 17, Sept. 14, 1907. May well be native here and in woods along the chalk downs (where it should be looked for). I name it *platyphyllos*, from the leaves hairy beneath, strongly ribbed fruit, few-flowered corymb, and buds tipped with hairs.—C. E. Salmon. Not the same as *T. platyphyllos* Scop. from other parts of England, the fruits of which are much more strongly ribbed, the buds and bracts longer, the leaves larger. It is apparently the same as a sheet of *T. mutabilis* Host, sent me by Dr. Halacszy from Austria; of this I have not found a description or synonym. E. F. Linton. [Host, *Fl. Austriaca*, ii. 60 (1831).]

Trifolium procumbens Linn. Apps Court, Surrey, v.-c. 17, July 24, 1907. My excuse for sending so common a plant is that these specimens struck me as peculiar-looking on account of their spreading hispidity. Most of those in the same neighbourhood had it adpressed. The character is of itself of little value in my opinion.—A. H. Wolley-Dod.

T. PROCUMBENS Linn. var. MAJUS Koch. Clandon Downs, Surrey, v.-c. 17, July 18, 1907. Gathered with Major A. H. Wolley-Dod. Not typical *majus*, which should have shorter peduncles, but best under that by its large heads, &c.—C. E. SALMON. Also sent by Major Wolley-Dod, who remarks: "By the size of its leaflets and flower-heads, as well as by its suberect habit, this should go to var. *majus*, but that is said to have shorter peduncles. Var. *minus* is a much smaller plant in all respects, but no hard-and-fast line can be drawn between them."—Type. Var. *majus* (not always a large plant) has golden-yellow flowers, as in *T. agrarium*; in this plant they are pale yellow.—E. S. MARSHALL.

POPULUS NIGRA Linn. Quorn, Leics., v.-c. 55, Aug. 13, 1907. Very tall tree, probably planted. The flowers were over before Mr. Jackson asked me to send it up again.—F. L. FOORD-KELCEY. Specimens from the same tree were sent to the Watson Club last year under the name *P. nigra* L., but the Rev. E. F. Linton called them *P. monilifera* Aiton, which surely they are not. Mrs. Foord-Kelcey showed me this tree in a field at Quorn last summer, and I found it to be a very fine typical example of the true Black Poplar. This can be distinguished at once from *P. monilifera* (Black Italian Poplar), by its rough burred trunk, denser foliage, and the leaves having a cuneate and not truncate base. I have since seen a photograph of the Quorn tree, which shows well the characteristic bole. *P. monilifera*, another name for which is *P. serotina* Hartig, is very common in this country as a planted tree, and is no doubt the Black Poplar of many botanists. (See W. B. E. C. Rept. 1906-7, p. 114).—A. BRUCE JACKSON. According to De Candolle's *Prodromus* (vol. xvi. part 2), which I chiefly rely on for distinguishing these introduced poplars, the base of leaf of *P. canadensis* (*P. monilifera* Ait.) is so variable as to be a poor character to distinguish it from *P. nigra*. The distinction in the male flowers is very decisive on the other hand, and till I know a great deal more about poplars than at present, I am content to take the *Prodromus* as a guide.—E. F. LINTON. From the mention of a "very tall tree," I think that this is more likely to be *P. canadensis*.—E. S. MARSHALL.

AVENA PRATENSIS Linn. var. LONGIFOLIA (Parn.), or near it. Limestone bank in Cressbrook Dale, Derbyshire, v.-c. 57, July 24, 1907.—A. B. JACKSON and T. E. ROUTH. Not so pronounced as Mr. Jackson's specimens distributed last year from Notts, though doubtless approaching "*longifolia*." I do not think this variety is recognized on the Continent, and has it anything beyond the longer leaves to separate it from type? If not, I cannot see much in it.—C. E. SALMON. This may perhaps be placed under the variety, but all my specimens of *longifolia* (Parn.) have longer leaves than these; on one of them Hackel remarked "a very slight variety," which still more applies to the sheet submitted to me.—E. F. LINTON. I believe rightly named. The leaves are unusually narrow, probably on account of the dry situation.—E. S. MARSHALL.

Poa palustris Linn. Bank of the Tay between Orchardneuk and Elcho, Mid-Perthshire, v.-c. 88, Aug. 21, 1907. For a notice of the discovery of this plant see Trans. Bot. Soc. Edinb. 1889, p. 265. In that notice Dr. White states the arguments for and against the plant being indigenous on the bank of the Tay. The point is a difficult one to resolve, and I am by no means satisfied that it is really indigenous there or at Bennybeg Pond, near Crieff, where we also found it the same year. On the Tay bank the plant is quite as abundant as it was on its first discovery, but it has not spread much. It cannot easily spread downwards, as there is a huge bed of *Phragmites* immediately below, and it has not spread upwards. It grows luxuriantly, attaining a height of five feet. My gathering was made at too late a period in the season, but I found some young plants which, with an older panicle, will give a good idea of its appearance before and after flowering. In the full flowering-stage it has not the same likeness to *Poa nemoralis* which it has before the panicle spreads out. In the notice above alluded to Dr. White says, "we made it out to be *P. palustris*," but the identification was made by himself, as I failed to make anything of it.—W. Barclay.

BOTANICAL NOMENCLATURE.

[The following Amendments to the International Rules for Botanical Nomenclature have been suggested for consideration of the Brussels Congress of 1910 by the Botanists of the British Museum, and others. The Rules themselves were issued as a Supplement to this Journal for 1906, and may be obtained from the publishers, price 1s.]

Introductory.

While we strongly deprecate any extensive alterations in the Code of Rules adopted in 1905, which we have strictly observed in our various publications, we venture to suggest two alterations. One aims at rendering more precise the interpretation of an existing rule; the other is of the nature of an extension.

Art. 2.—We think that this Rule needs illustrative examples to define the expression "still-born" (totgeboren), under which certain names are excluded (see Schinz and Thellung in Bull. Herb. Boiss. sér. 2, vii., 101, 1907). Arbitrary changes such as *Linum multiflorum* Lam. (Fl. Franç. iii., 70, 1778) for *L. Radiola* L. are evidently excluded. But we do not think that such names as *Cucubalus latifolius* Mill. (Gard. Dict. ed. 8, n. 2, 1768) are excluded by the Rule. Miller separated from the Swedish plant *C. Behen* L. the English plant which he called *C. latifolius*. Every one now agrees that these two are really conspecific. But it is not possible to use the name *Silene Behen*, as the genus *Cucubalus* is now united

with *Silene*, and there is already a *Silene Behen* L. (Sp. Pl. 418). The name *latifolius* is thus the earliest name available for the species and should not be rejected.

Art. 36.—For the present article substitute: "The publication of names of new groups is valid only when they are accompanied by a diagnosis preferably in Latin, but permissively in English, French, or German."

Art. 39.—Eliminate the last sentence.

Rec. XX.—Eliminate all after "diagnoses."

A. B. Rendle.
James Britten.
E. G. Baker.
A. & E. S. Gepp.
W. E. St. John Brooks.
William Fawcett.
Spencer Moore.
Annie Lorrain Smith.

REVIEWS.

Les Iles Canaries : Flore de l'Archipel. Par J. Pitard et L. Proust. 8vo wrapper, pp. 502 ; 19 plates. Paris : Klincksieck. Price £1.

This useful and needed addition to the steadily extending number of local floras will be welcomed by students of botanical geography as well as by systematists. The fine and costly work of Webb and Berthelot was not easily accessible, and was concluded sixty years ago ; the list published by Fritz Sauer in 1880 —a useful compilation, giving in tabular form an enumeration of Canarian plants compared with neighbouring floras—gave no details as to the plants of the separate islands ; and there was thus ample room for a work like the present, the result of two visits of six months each to the thirteen islands forming the archipelago in 1904–6 and of an investigation of the literature dealing with the subject.

In the volume before us, the phanerogams and vascular cryptogams are undertaken by the botanists whose names appear on the title-page ; in the mosses M. Pitard has had the assistance of Dr. Négri and in the hepatics that of M. Corbière. Another volume, which will be finished by the end of the year, will contain the algæ, by MM. Borzi and De Toni, and the lichens, by M. Pitard and the Abbé Harmand. The enumeration is preceded by a valuable and interesting preface, in which are discussed the geography and topography of the group, the soil, the zones of vegetation, with the plants characteristic of each, the types—divided into "ubiquistes," "méditerranéo-canariens," and "endémiques" (these

grouped under genera, species, and varieties)—a valuable study of the affinities of the Atlantic types, and lists of the new species, hitherto undescribed or new to the islands.

In the enumeration the order followed is that of Bentham & Hooker. For each plant useful references are given to place of first publication and to readily accessible floras; the distribution in the various islands is detailed, and that in other countries is generalized; new forms are of course fully described.

While it would appear that trouble has been taken to bring together the scattered literature bearing on the islands, it must be pointed out that by an unfortunate oversight the work of the late Rev. R. P. Murray has been almost entirely ignored. We say "almost," because two names, neither of which as they stand were published by him, are accredited to him: "*Æonium percarneum* Murray (1889)" and *Æ. hierrense* Murray (1889) (p. 191). No bibliographical reference is given; but the plants here intended were published—as species of *Sempervivum*—in this Journal for 1899 (pp. 201, 395) in a paper containing interesting critical notes on Canarian and Madeiran *Crassulaceæ*, with the description (p. 201) of a new *Sedum*, *S. lancerottense*, which is not mentioned by MM. Pitard & Proust. Murray's earlier paper on "Species of *Lotus* § *Pedrosia*" (Journ. Bot. 1897, 381–387), containing descriptions of *Lotus dumetorum* (Webb. MSS.), *L. emeroides*, *L. salvagensis*,* and a new variety—*angustifolius*—of *L. glaucus* has also been overlooked; nor do we find any mention of *Vicia scandens* R. P. Murray from Teneriffe, described in this Journal for 1895, p. 9. It would seem that the authors were unaware of Murray's work on the Canarian flora, of which at one time he hoped to publish a connected account; but it is strange they should not have endeavoured to trace the plants which they attribute to him under *Æonium*. The new forms (including a new species) described under *Lotus* should be compared with the descriptions of Murray's novelties, and his critical notes on the genus deserve attention.

There are some interesting notes on introduced and naturalized plants: the Mexican *Hunnemania fumariæfolia*, for example, has spread rapidly during the last eight years in Lanzarote, where it escaped from gardens; its wider dissemination is generally encouraged, as it is greatly appreciated by dromedaries; *Oxalis cernua*, an earlier introduction, has spread with astonishing rapidity though many of the islands, and another African species, *O. purpurea*, is now abundant in the turf in Teneriffe; *Acacia Farnesiana*, from America, is completely naturalized in Gomera and elsewhere.

A small point of nomenclature attracts our attention. *Medicago minima* is quoted as of "Grufberg ap. L. Amœn. iv. 105." The *Flora Anglica* here quoted, although demonstrated by Grufberg, owed its authorship to Linnæus, and first appeared in the Dissertations (reprinted in the Amœnitates in 1759) in 1754. More-

* These are also omitted from *Index Kewensis*, Suppl. 2.

over, as has been shown in this Journal (1907, p. 434), the names in this Flora bear the same rank as they do in the *Species Plantarum*: *M. minima* should be quoted as of Desrousseaux in Lam. Encycl. iii. 636 (1789).

The volume is illustrated by nineteen useful plates, giving aspects of vegetation and portraits of individual plants, and is in every way a valuable addition to botanical knowledge.

J. B.

Bref och skrifvelser af och till Carl von Linné, med understöd af Svenska Staten utgifna af Upsala Universitet. Första afdelningen. Del i. och ii. Stockholm: Aktiebolaget Ljus, 1907–8. 8vo. Del. i. Skrivelser till offentliga myndigheter och till kungl. Vetenskapssocieteten i Upsala. Utgifna och med upplysande noter försedda af Th. M. Fries. 1907. Pp. iii. + 343. Del. ii. Skrivelser och brev till K. Svenska Vetenskapsakademien och dess Sekretarare. . . . . 1908. Pp. ix. + 377. Figs.

These volumes form the first two of what must certainly be the standard edition of the letters of Carl von Linné. The general scheme is set out on the back of the wrapper of each volume, and in consequence of the multitude of letters and communications which must be included, the work is divided into the four divisions as follows:—

I.—Letters and communications to Swedes, Finns, Danes, and Norwegians.
II.—Letters from persons of the mentioned nationalities.
III.—Letters to the remaining correspondents.
IV.—Letters from the same.

It will be seen that the volumes now under review fall under the first heading; the first volume containing letters to public authorities, from the king (thanking him for the title of Archiater) onwards, and the Royal Scientific Society at Upsala. The second volume deals with written communications to the Royal Swedish Academy of Science, and its successive secretaries.

This publication is one of the results of the "Linnéfest" of 1907, is supported by State funds, the Riksdag having readily voted the required subsidy, published under the authority of the Royal University of Uppsala (to use the modern spelling) and edited by Prof. Th. M. Fries, who supplies the explanatory notes. No more admirable editor could have been chosen; a successor of Linné in the Chair of Botany at Uppsala; the author of the fullest biography of his eminent countryman and predecessor; steeped from his earliest years in the Linnean traditions handed down from his venerable father, Elias Magnus Fries; a diligent student in his tranquil retirement from professorial duties of every document which could bear upon his work, he must be held to be an ideal editor for the important work to which he has been called. He would certainly be the first to acknowledge the indebtedness of the whole scientific world in general, and Sweden in particular,

to his forerunner Dr. Ewald Ahrling of Arboga, who devoted his life to Linnean studies, and whose name appears on nearly every page of these volumes, many of the letters being printed from his transcript from the originals at the Linnean Society of London, or in private possession.

Turning for a short time to the contents of these volumes, each item is numbered, and is followed by the editorial notes, which, in many cases, extend to more than the letters themselves, but nothing could be spared. Under the heading "Skrivelser" we find a reprint from the manuscript of that exceedingly scarce pamphlet *Berättelse om The Inhemska wäxter, som i brist af säd, kunna anwändas till bröd- och matredning*, and his report on his Lappland journey, with a return of his expenditure. We also have the instructions Linné drew up for Ternstroem before he sailed for the far East, 3 Dec. 1745 (No. 213, p. 53–54).

In the second volume is given an account of the seals used by Linné, with cuts showing the designs; these are cited throughout, and in many cases of undated letters afford a useful clue to the period of writing. There is an interesting sentence in a letter early in 1764, where he says: "Linnæus or Linné are one and the same to me, the one is Latin, the other Swedish" (No. 361, p. 265).

Practically the whole of this correspondence and the notes are in Swedish, and the bulk of the work forbids us to hope for a translation into some language better known to the majority of botanists. To those who can follow the terms of expression used by the writer these volumes are full of interest. Probably the next volume will show some of the correspondents' own letters, presumably in their original language. Very many persisted in using their mother tongue, *e. g.* Réaumur, Collinson, Ellis, and Philip Miller. In some cases a brief transcript into Swedish exists, probably drawn up by a pupil, but the majority were most likely read to the professor in a running and verbal translation only.

Whilst congratulating Emeritus Professor Fries on the result of his labours thus far, we must give expression to our sincere hope that he may succeed in completing a series of volumes which must be of permanent value, and take a worthy place in Swedish literature.

B. Daydon Jackson.

A Guide to the Natural History of the Isle of Wight. Edited by Frank Morey, F.L.S. Demy 8vo, cloth, pp. xx. 560; illustrations and map. Price 8*s.* 6*d.* net, by post 9*s.* Wesley & Son.

This handsome well-printed volume reflects great credit upon the County Press, Newport, Isle of Wight, which has been entrusted with its production. It may be urged that the literary contents of a book are of more importance than its appearance, and hence claim first mention; but on the other hand, it is the externals which first strike us, and which insensibly prejudice the reviewer favourably or unfavourably towards the volume he is

about to consider. And in most cases it will be found that the trouble bestowed upon the contents of a book is reflected in the care taken with its externals.

In the volume before us the two certainly go together. Mr. Morey has been fortunate in securing a competent staff of writers, among them some whose names are unfamiliar to us, but whose share gives evidence of care and promise of future work. Confining ourselves to the botany, with which alone we are concerned and which occupies 160 pages, we find that the flowering plants and ferns have been undertaken by Mr. Frederic Stratton, who was in the first instance consulted as to the production of the work and whose knowledge of the phanerogams of the island extends over a period of more than forty years—his first contribution to our pages dates from 1868. There is no need to say more, except that Mr. Stratton in the brief history of botanical observation in the Island omits any reference to his own important share in the work of investigation. The fungi are undertaken by Mr. J. F. Rayner, whose useful bibliography of the subject should be completed by a mention of the volume on *British Basidiomycetes* published last year by the Trustees of the British Museum; it may well be, however, that this appeared too late for inclusion. The freshwater and terrestrial algæ have mostly been identified by Mr. G. S. West, from material supplied by various collectors; the marine algæ are enumerated by the editor, who acknowledges the help of Mr. E. M. Holmes. The Rev. H. M. Livens has compiled the list of lichens, to which Mr. J. A. Wheldon prefixes a useful introduction dealing with their structure; Mr. Livens has also undertaken the mosses, with the help of Mr. Ingham. The volume contains an excellent map and numerous illustrations—including *Calamintha sylvatica*, *Hyoscyamus*, and *Epipactis palustris*—from photographs.

The African Floras.

The African Floras prepared at Kew continue to make steady progress; a new part of each was issued during March. *The Flora of Tropical Africa* begins a new (the sixth) volume, which will consist of two sections—an inconvenient arrangement rendered necessary by the fact that volumes seven and eight have already been published. This part includes the orders *Nyctaginaceæ* to *Hernandiaceæ*; for most of them Mr. J. G. Baker is primarily responsible, but, his MS. having been prepared many years back, the help of Mr. C. B. Clarke and Mr. C. H. Wright has been obtained in the final preparation for press. The *Myristicaceæ* and *Lauraceæ* are undertaken by Dr. Stapf; Mr. Sprague deals with the *Hernandiaceæ*, one of which, *Illigera pentaphylla*, was placed in Fl. Trop. Afr. ii. 436 under *Gyrocarpus Jacquini*.

The *Flora Capensis* concludes the bulky first section—nearly 1200 pages!—of its fourth volume with the *Gentianaceæ*, by Colonel Prain and Mr. Hill; half of the part is occupied by the completion of the *Asclepiadaceæ* by Mr. N. E. Brown; Colonel

Prain and Mr. Cummins elaborate the *Loganiaceæ*; a new key to the *Ericaceæ*, by Mr. Brown, is given in an appendix. We are sorry to see that the practice adopted in the later but not in the earlier volumes, in accordance with which such names as *Listeriana* are spelt with a small initial, is still retained, although in other Kew publications it has been abandoned.

In the preface to the volume, the editor, Sir W. Thiselton-Dyer, delivers himself of a protest against the now practically universal custom of adopting the earliest specific name; this he has "disregarded where an existing name is available which has correctly placed a species in the genus to which its affinity is most obvious." This method, he says, "is based on technical grounds equally with those of common sense"—a dictum which cannot be said to err on the side of modesty, seeing that the assembled botanists at the Vienna Congress (to which we believe Kew declined to send an official representative) arrived at an opposite conclusion. The editor proceeds to give the grounds for his view, which he stated at greater length in his address to the British Association at Ipswich in 1896 (see Journ. Bot. 1896, 114). It is obvious that he should have urged these on the Congress, and that only inconvenience can result from adopting the Vienna Rule in some of the Kew publications and ignoring it in others. The view of the British Museum botanists was formerly that now maintained by Sir W. Thiselton-Dyer; but it seems to them that, in the interests of order, the decision of the Congress should be accepted.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on March 18th, Miss Sibyl Longman gave the substance of a paper entitled "The 'Dry-Rot' of Potatoes," illustrating her account by diagrams. She pointed out, as the result of her researches, that the disease of the potato tuber, known as "dry-rot," due to the fungus *Fusarium Solani*, is not necessarily preceded by "wet-rot," but may be set up in sound tubers by inoculation with spores or mycelium of *F. Solani*, which species is not a parasite of the resting tuber only; it may also attack and kill the shoots of potato plants. The fungus, which probably exists as a widely distributed saprophyte in the soil, infects the growing potato plant *viâ* the root; it also spreads from tuber to tuber during storage, and diseased tubers may produce diseased plants. Heat sterilization of the resting potato tuber, with respect to *F. Solani*, is impracticable, for the death-temperature of the fungus is higher than that of the potato. A pycnidial stage occurs in the life-history of *F. Solani*, which should therefore be placed in the highest group of the Fungi Imperfecti, the *Sphæropsidaceæ*, and not, as is the case at present, in the Hyphomycetes. An animated discussion followed, in which Mr. G. Massee stated that various forms were usually found in conjunction with the fungus described, and alluded to Bernard's

theory of tuberation being always dependent upon some species of *Fusarium*. Prof. Keeble mentioned that Miss Longman's cultures had been derived from a single spore, from a hanging drop, and upon material sterilized according to modern bacteriological methods,

At the same meeting was read a second paper by Mr. A. S. Horne, "On the Structure and Affinities of *Davidia involucrata* Baill." The paper dealt with the structure and affinities of a genus which has been referred by various authorities to *Combretaceæ*, *Cornaceæ*, and *Hamamelidaceæ*, and was based upon material brought by Mr. E. H. Wilson from Szechuen in 1904. Evidence is advanced in favour of interpreting the inflorescence as consisting of a number of congenitally-fused, apetalous, multistaminate male flowers, or of male and in addition a single obliquely-situated, apetalous, hermaphrodite flower with epigynous stamens arranged in series. From a detailed study of the flower, ovary, ovule, and seed, the author is inclined to believe that *Davidia* is distantly related to *Alangium* and *Nyssa*, and still more distantly related to the *Araliaceæ*: that the genus occupies a somewhat isolated position owing to having pursued an independent course of development from the plexus of primitive groups, which included the ancestral forms of the *Araliaceæ*, *Nysseæ*, and *Alangieæ*.

At the meeting of the Linnean Society on April 1st, Dr. Marie Stopes exhibited several microscopic slides and micro-photographs of plant petrifactions from Japan. The petrifactions are of Cretaceous age, and are preserved as masses of fragments in some degree like the palæozoic "Coal-balls." The specimens included a number of new genera and species whose structure throws light on the flora of the Cretaceous period, and particularly is important in relation to the question of the early Angiosperms. These specimens are the first to be worked on from these beds. At the same meeting Mr. A. D. Darbishire exhibited seven cases of specimens as the results of breeding experiments with Peas, illustrating Mendelian phenomena; and Mr. Arthur W. Sutton showed a large series of seeds, some being results obtained by crossing *Pisum arvense* from the neighbourhood of Jaffa in Palestine, with varieties of culinary peas, *P. sativum*.

The *Transactions of the British Mycological Society* for the season 1908 (vol. iii. pt. 2, price to non-members 10*s*. 6*d*.; published 31st March) shows a satisfactory amount of work and contains many papers of interest, including the description of a new *Pseudophacidium* (*P. Smithianum*) named by M. E. Boudier in compliment to Miss A. L. Smith, who herself contributes a paper on new or rare microfungi. "Fungus Notes for 1908," are by the veteran Dr. Cooke, who also asks "What is *Hygrophorus Clarkii* Beck. & Br.?" and answers "nobody knows"; to this paper a "note" is appended which we, in common with those to whom we have shown it, fail to understand. Mr. Charles Crossland gives a long list of "Omitted Asci measurements of some British Discomycetes"; and Mr. A. D. Cotton has what is evidently an important paper on Marine Pyrenomycetes. Mr.

Carleton Rea's presidential address—"Some remarks on basidia and spores and the classification suggested by their study"—is rendered almost unreadable by the wild vagaries and varieties of typography which disfigure its pages, and by its "solid" printing. The volume includes six plates, three of which are coloured.

Mr. Frank Arthur Bellamy has undertaken a labour of love in the preparation of *A Historical Account of the Ashmolean Natural History Society of Oxfordshire*, 1880–1905—a body of which he is the Honorary Secretary and has been President, It forms a volume of six hundred pages, which includes a very full index, and is dedicated to Mr. G. C. Druce, to whose energy the original formation of the Oxfordshire Natural History Society in 1880—with which the Ashmolean society was amalgamated in 1901—was mainly due. The record errs on the side of over-completeness—the book might have been reduced by at least one-half without detriment to its general interest; even the members of the Society can hardly find of permanent value the tables of attendance at committee meetings for twenty years, to which ten pages are devoted. The list of exhibits at the Society's meetings, classified under sections, occupies pp. 346–377; those under Botany mostly stand under Mr. Druce's name, and here some further information would sometimes have been welcome—*e. g.* on Nov. 29, 1889, is recorded "a semi-parasitic Yellow Rattle from Llanberis (*Rhinanthus anglicus*) a new variety, hitherto undescribed for Great Rritain (p. 355)"—this we do not find in Mr. Druce's *List*. On the same page we read that "Dr. J. A. H. Murray stated that he had found *Cotoneaster* at Great Orme's Head, Anglesey [*sic*], and Mr. Druce said that that particular spot was a new station for it." On the opposite page we read that Mr. Druce "exhibited a sedge (*Carex rhynchophysa* L. C.) found in Ireland, and once supposed to be the only British species; it was not a new Irish plant, or an addition to the flora of these islands." These and similar entries suggest that it would have been well to submit the botanical entries to Mr. Druce for revision. On the same page it is said that "Miss Swann showed a grass, easily grown, which would form a good substitute for osprey feathers for adorning women's hats"; but the name of the grass is not given! The volume, which is well printed and has a portrait of J. O. Westwood as frontispiece, is published by the author, who must have incurred considerable expense in its production.

The third edition of Dörfler's indispensable *Botaniker-Adressbuch* (Wien, iii. Barichgasse 36; price 13s.) is evidently much more complete than its predecessor as it contains 450 pages as against the 356 of the second edition, issued in 1902. The list of botanists for Great Britain and Ireland occupies twenty-four pages, and by its extent is an answer to the pessimistic view sometimes enunciated that the interest nowadays taken in British botany is somewhat small; for it seems not unfair to assume that the bulk of those whose names are not associated with official posts are in some way concerned with our island flora. The

number of misprints in proper names is commendably small, though it might still be worth while, for future issues, to submit the final proofs to some English reader for correction. The typographical arrangement is, as usual, excellent, but from the point of view of convenience, we think it a mistake to have added to the bulk of the volume by binding with it the in-itself-excellent book-catalogue of 268 pages just issued by W. Junk of Berlin.

We are glad to learn that the results of Mr. F. Hamilton Davey's ten years' work upon the botany of his native county is announced for publication in July. His *Flora of Cornwall* will form a volume of nearly six hundred pages, and will include the flowering plants, higher cryptogams and *Characeæ*, as well as a specially prepared botanical map and six portraits of deceased workers at the flora; the history of botanical research in Cornwall will be fully treated. The price of the book to subscribers will be 16*s.*; names should be sent to Mr. Davey, Beechwood, Perranwell Station, S.O., Cornwall.

Mr. Francis Darwin contributes to the March number of *Notes from the Royal Botanic Garden, Edinburgh*, an article on "A Botanical Physiologist of the Eighteenth Century." This was John Hope (1725–86), who was Professor of Botany at Edinburgh from 1761 until his death in 1786. Mr. Darwin reproduces some of Hope's drawings, and refers to a MS. volume of his lectures. An account of Hope's life and work is promised for an early number of the *Notes*.

An article headed "Roses" in the *Daily News* of April 19 is a good example of newspaper botany. The author, treating "not of a mere sept, but of the whole order of the rosaceæ" deals with a plant which we find it difficult to identify. It seems by its four petals to be the tormentil, but the writer calls it "potentil" and refers to its runners, thus appearing to indicate cinquefoil. But when we are told to "note with a sigh of satisfaction its strawberry-like, rose-like leaves" we feel that neither tormentil nor cinquefoil, but some plant unknown to us, is intended, and, in spite of Mr. Desmond, "write it down as one of the puzzles of botany." Here is the passage:—"It is the potentil, not with a juicy flower-stalk but with a hard, dry one of the same construction and use. And the potentil has not five petals but four. Why? Simply in order to fog young botanists, you will say. No; but because of its habit of growing in hard, dry places. It has had one of its proper petals starved away, and where it has strayed into richer soil you will find flowers with all their five petals. Grapple this yellow, crucifer-like potentil into the rose tribe. See how its fruiting resembles that of the strawberry rather than the lesser celandine, and note how it sends out runners like the strawberry rather than the creeping buttercup. Note with a sigh of satisfaction its strawberry-like, rose-like leaves, and you will not find it necessary merely to take its affinity on authority and write it down as one of the puzzles of botany."

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Assisted by the Staff of the Cambridge Botany School.

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Contents of April Number.—The Morphology and Anatomy of *Utricularia brachiata*, Oliver (Text-figs. 6–12), by R. H. Compton. On two new Members of the *Volvocaceæ* (Text-figs. 13–15), by B. Millard Griffiths. On an Abnormal Gynœceum in *Stachys sylvatica* Linn. (Text-figs. 16–17), by A. W. Bartlett. Note on the Sporophyll of *Lycopodium inundatum* (Text-figs. 18–19), by M. G. Sykes. Supplementary Note on the Anatomy of *Saxegothæa conspicua* Lindl., by W. Stiles. Notes on Recent Literature:—The Mode of Pairing of Chromosomes in Meiosis, by R.P.G. M. Paul Bertrand on the Stems belonging to *Clepsydropsis*, by Isabel Browne. British Basidiomycetes, by *F.T.B.*

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NEW CHINESE PLANTS.

By S. T. Dunn, B.A., F.L.S.

Clematis filamentosa, sp. nov. Frutex alte scandens, caule striato. Folia glabra, trifoliata vel floralia unifoliata; foliola cordato-ovata, acuminata, integra, 2–3½ pol. longa, subcoriacea, apice apiculata, venis primariis 5, palmatis. Flores eperulati, paniculas foliatas, axillares facientes; sepala 4, lineari-lanceolata, 9–11 lin. longa, extus tomentosa, obtusa; staminodia ligulata, sepalis paullo longiora, in stamina eis dimidio breviora gradientia; filamenta ligulata; antheræ 2-lin. longæ eorum medio affixæ. Ovaria pubescentia, stylis barbatis.

China: Hongkong. New Territories at Ha Hang near Taipo, *Dunn*, Hongkong Herb. n. 1099.

The greatly prolonged filaments at once distinguish this *Clematis* from all others of S. China.

Tutcheria microcarpa, sp. nov. Arbor 15 ped. alta, sine floribus et alabastris, glaber. Folia ovato-lanceolata, obscure crenato-serrata, margine revoluta, 1½–5 pol. longa, coriacea, utrinque reticulata, obtuse acuminata, basi cuneata, petiolo ¼–½ pol. longo. Flores solitarii, in axillis summis subsessiles; capsula trigono-ovata, tribus valvis deciduis dehiscens, columna trigona centrali persistenti, maturitate sparse sericea; semina castanea nitida, in loculo sæpe 3, lateraliter columnæ affixa, oblongo-ovata, faciebus internis varie exsculptis, externis teretibus, testa ossea.

China: Kwantung, Lo Fou Mountains, *Ford*, n. 610; Hongkong, Mt. Nicholson, Hongkong Herb. n. 2058; Fokien, Lin Fa Mountain, at 2800 ft., n. 2459.

All these specimens are in fruit, and all efforts to find the tree in flower have so far been unsuccessful. But as the capsule agrees closely with that of *Tutcheria*, which is readily distinguishable from all allied genera by its fruit alone, I have waited no longer to place it in that genus. I may here add what was inadvertently omitted in the generic description (Journ. Bot. 1908, p. 324), that the genus is named after Mr. W. J. Tutcher, F.L.S., for more than seventeen years Assistant Superintendent of the Botanical and Forestry Department of Hongkong, who first directed my attention to its distinctive characters.

Tephrosiæ sectio nova Millettiopsis. Stylus complanatus, imberbis vel brevissime barbatus; folia reticulato-penninerviis.

Tephrosia (Millettiopsis) **Tutcheri,** sp. nov. Arbor 10–20 ped. alta, ramis junioribus pubescentibus. Folia alterna, imparipinnata, 8–14 pol. longa, 15–17-foliolata, rachidi pubescente; foliola oblongo-lanceolata, acuminata vel obtusa, 2–3½ pol. longa, chartacea, breviter sericea, supra glabrescentia, apice apiculata vel retusa, basi rotundata, venis secundariis distantibus, 5–8-jugis, petiolulis 1 lin. longis. Racemi multiflori, cum foliis in ramorum apicibus collecti. Flores secus pedunculos pubescentes nodo-fasciculati, breviter pedicellati; calyx campanulatus, sericeus,

breviter dentatus, dentibus 2 posticis fere coalitis; corolla pallide cœrulea, 5–6 lin. longa, calyce 4-plo longior, extus tenuiter sericea, carina incurva obtusa; ovarium lineare sericeum, 3–6-ovulatum, stylo incurvo imberbi, subcorneo, complanato, stigmate nudo; legumen 4–5 pol. longum, lineare, ad basin angustatum, compressum, leviter marginatum, 2-valve, tomentosum, tarde glabrescens; semina 2–4, lenticularia, 5 lin. diam.

China: Hongkong Island, mixed woods on the hills behind Aberdeen, *Tutcher*; near Little Hongkong, Kongkong Herb. n. 1972, near Sheko, n. 1902, Lantao Island, 25.5.88.

Like most of the novelties recently described from the island, it was gathered by my energetic colleague Mr. Tutcher, after whom I have named it.

To this species must be added as a second member of the new section Hance's *Tephrosia ovaria*, also from Hongkong (Journ. Bot. 1886, 17). It was referred by him to the section *Brissonia*, with which it agrees in its inflorescence. The venation of its leaves resembles that of *T. Tutcheri* and of a few Australian and Javan species (*T. flammea* F. Muell. &c.) in being reticulato-pennineryed like that in *Millettia* and not lineate as in other *Tephrosia* species.

Tephrosia ovaria Hance. Descriptioni l. c. addendum: flores purpureo-rosei; legumen cuneato-obovatum, 2-3 pol. longum; semina 1–2.

China: Hongkong Island, Mt. Kellett, South, *Tutcher*, Hongkong Herb. n. 4663, Aberdeen, n. 5343.

Atylosia crinita, sp. nov. Frutex gracilis, scandens. Caulis petiolique striati, in striis dense, alibi exigue, pubescentes. Foliola 3, exstipellata, terminale regulariter, lateralia oblique rhomboidea, integra, 2–4 pol. longa, 1–2 pol. lata, papyracea, supra breviter sed molliter pubescens, infra molliter hirsuta, punctis resinosis conspersa, petiolo communi 2–3 pol. longo. Racemi axillares, 3-5 pol. longi. Flores fasciculati, bracteis parvis, ovatis, caducis, bracteolis nullis, pedicellis calyce brevioribus; calyx pilis longis aureis sparse crinitus, punctisque resinosis conspersus, lobis 4, acutiusculis, ovatis, tubo equalibus vel brevioribus, superiore paullo aliis longiore; corollæ glabræ vexillum late ovatum, 6–9 lin. longum, retusum, calyce 2–3-plo longius; alæ oblongo-ovatæ, calyce circiter bis longiores; carina in rostrum incurvum obtusum protracta; ovarium circiter 7-ovulatum, pilis aureis dense crinitum, punctis resinosis conspersum; stylus pubescens filiformis. Legumen tenue, lineare, acutum, 1½–2 pol. longum, 3-4 lin. latum, inter semina lineis transversis leviter depressum; semina rhomboidea, strophiolata, 2 lin. lata, rubra.

China: Kwantung, Hainan Island, *Ford*, n. 366; Lienchow River, *Ford*, 13.8.87.

Ormosia mollis, sp. nov. Arbor, ramulis dense pubescentibus striatis. Folia pinnata, 10-12 pol. longa; foliola 3-5-juga, opposita, oblongo- vel ovato-lanceolata, integra, 3–6 pol. longa, chartacea, supra glabra, subtus molliter hirsuta, obtuse acuminata,

basi rotundata. Flores racemoso-paniculati, pedunculis cum calycibus molliter fulvo-velutinis, bracteis parvis persistentibus, pedicellis 6 lin. longis; calyx in fructu late infundibuliformis in lobos 5, ovatos, obtusos ultra medium fissus, 6 lin. longus et latus, coriaceus; ovarium 8–10-ovulatum. Legumen breviter stipitatum, oblongum, fortiter compressum, late marginatum, inter semina, et etiam ovula, constrictum cohærens, glabrum, siccitate nigrum, apice basique acuminatum; semina 1–5, ovata, leviter compressa, rubra, 4 lin. longa.

China: Kwantung, Lienchow River, *Ford*, n. 60, 1887; Fokien, near Foochow, *Capt. Hodgins*, Hongkong Herb. n. 3972.

Ammannia myriophylloides, sp. nov. Herba aquatica, præter inflorescentia submersa; caulis solitarius indivisus. Folia mediana dense verticillata, capillaria, indivisa, 8–12 lin. longa, internodiis multo longiora, suprema breviora, distantiora, in bracteas progredientia. Flores 5–8-ni, verticillati, spicas interruptas facientes, 1–2 lin. longi, bracteas verticillatas lanceolatas vix excedentes; calyx campanulatus, dentibus 4; petala 4, rosea, fauce calycis inserta, rotundata; stamina 4; ovarium globosum.

China: N. E. Kwantung, in pools at Kwen Ping near Hoi Fung, Mr. Dunn's native collector, Hongkong Herb. n. 1838.

As will be gathered from the above diagnosis, this aquatic bears a close resemblance to *Myriophyllum verticillatum*. Although it constitutes an entirely new type of *Ammannia*, it is not altogether surprising to find a member of this marsh-loving genus adapted for open water life.

Acanthopanax nodiflorum, sp. nov. Frutex ramis aculeatis. Folia quinata, sæpius petiolo longiora; foliola ovata, utrinque acuta, dense serrulata, 1–1½ pol. longa, papyracea, utrinque scabrida. Flores umbellati; umbellæ terminales cum foliis in ramis brevissimis, lateralibus nodosis confertæ, petiolis æquales, 7–10-floræ.

China: Kwantung, Lienchow River, *Ford*, n. 93, 1887.

This species resembles *A. spinosum*, but may be distinguished by its scabrid leaflets and by its terminal inflorescence.

NOTES ON THE FLORA OF DERBYSHIRE.

By E. & H. Drabble.

In 1903 justice was done to Derbyshire by the publication of an excellent *Flora* of the county, written by the late Rev. W. R. Linton, M.A. During the time of its preparation, at Mr. Linton's request, one of us sent to him lists of plants found in various parts of the county, and after its publication continued to send records to him. Owing to his lamented death in January of last year—an irreparable loss to British field-botanists—it becomes necessary to publish these records, together with others obtained last season, in our own names.

In these notes twenty-four new county records are given (including varieties), and records of about one hundred and eight plants new to the geological formation on which they were found. In our list new county records are marked with a †, while records new for the geological formation under consideration are starred.

A step greatly in advance of the majority of "County Floras" was taken by Mr. Linton in recording the distribution of the plants separately under each geological formation. This brings out clearly the striking effect of the subsoil on the flora. Much may be, and indeed has been, said in favour of the primary division of a district according to river-valley-systems, and to a certain extent it may be desirable in some instances to adopt this method, especially in comparatively flat districts with but little diversity of geological substratum. In Derbyshire, however, where the geological formation is extremely diversified, that mode of division as a primary one would be eminently unsatisfactory, and it is doubtful whether it would have any manifest advantages even as a secondary mode of division. In the following list Mr. Linton's divisions are followed in the main, but for reasons to be stated they are departed from in two particulars.

P. On the eastern side of the county lies a district formed of Permian Limestone underlain by a thin formation of sandstone. This Permian formation had been but slightly worked at the time of the publication of the *Flora*. In the present paper a few additional notes are given.

C. The Coal Measures comprise the greater part of the north-eastern and eastern parts of the county, and also occur in the west as an extension of the Lancashire and Cheshire Coal Field. The country lying upon this formation, unlike that on the Coal Measures of South Lancashire as a whole, is in many places charming and attractive, and possesses a rich and varied flora. The main coal-yielding strata are those of the upper and middle Coal Measures. The lower Coal Measures consist of thin flags, fine grits and shales, with very little coal, and their surface features, and to a less extent their flora, approximate somewhat to those of the succeeding formation, the Millstone Grits; but on the whole the flora is more closely related to that of the upper and middle Coal Measures, and is more naturally treated under this head than the next.

G. The extensive Millstone Grit formation in Derbyshire everywhere lies between the Coal Measures above and the Yoredale Series below, and forms a ridge running from north to south through the northern and central parts of the county. Millstone Grit occurs again on the west of the county between the Yoredales and the Coal Measures belonging to the Cheshire and South Lancashire Coal Field. There is also a small patch of Grit in the extreme south of the county in the neighbourhood of Melbourne. Mr. Linton divided the Grit formation into two parts, G_1 and G_2, by an arbitrary line from Ringinglow to Brough; in this paper this arbitrary division is ignored, and the Grit is treated as a single formation, as indeed it is geologically.

Y. The so-called Yoredale Series lies between the Grits and the massive Carboniferous Limestone formation. The applicability of the name Yoredale to this series is somewhat uncertain. Dr. Wheelton Hind (Geol. Mag. 1897) considered the Upper Limestone in Derbyshire to be the equivalent of the Yoredales of Wensley Dale, and suggested that the name Pendleside Group should be used for the Derbyshire "Yoredales." Until some satisfactory conclusion has been arrived at by geologists, it is convenient to retain the term Yoredales for the formation under consideration. In Derbyshire the Yoredales consist of shales, interbedded with thin limestone and sandstone layers. Mr. Linton deals with them under the heading of Limestone; it seems to us desirable to treat them as a separate formation, since not only are the surface features of the country very different, but what is more important, from our point of view, they produce a flora very distinct from that of the underlying Carboniferous Limestone. At present the flora of this formation as distinguished from that of the Limestone has been but slightly worked in detail. We are able, however, to give a few notes on this system.

L. The Carboniferous Limestone formation is too well known to need any description. Its flora is very characteristic.

The Triassic formation of the south of Derbyshire has not been worked by us.

There is one aspect of the subject which we cannot allow to pass unmentioned. In such a county as this the artificiality of treatment necessitated by the restriction of investigation within the limits of the county itself, in most respects a purely arbitrary area, often quite without reference to geological or physical considerations, is very obtrusive. The small Permian area on the east of the county is really only a small portion of the extensive Permian tract of Yorkshire and Nottinghamshire, and possesses a flora curious when contrasted with that of Derbyshire generally, but perfectly in accordance with that of the Magnesian Limestone as a whole.

The Coal Measures of the north-east, again, form part of the great South Yorkshire and North Derbyshire Coal Field, and the flora of the whole area of the district ought to be considered and compared with that of the South Lancashire and Cheshire Coal Field, a small portion of which falls within North-west Derbyshire. Under the present system we are obliged unnaturally to treat these separate tracts together as the Coal Measures of Derbyshire, thereby obscuring much of the true significance of the distribution. The same remarks apply to the Grits and to the Triassic tracts of South Derbyshire. At the same time, the careful and detailed working of County Floras and the publication of many records and localities will enable us eventually to complete a flora of each natural geological district irrespective of county boundaries. When each district has been treated in this manner a natural presentation of the distribution of each species throughout the British Isles will have been given.

Anemone nemorosa L. (C) Dore (with deep purple flowers).—*Ranunculus Bachii* Wirtg. (We are unable to agree with the *London Catalogue* and other lists in reducing this plant to a variety of *R. fluitans* Lam.; it seems to us quite worthy of specific rank); (L) Castleton.—*R. peltatus* Schrank. (C) Newbold.—*R. Lenormandi* F. Schultz. (C) Calow, Wingerworth, Brimington, Sutton Scarsdale.—*R. sceleratus* L. (C) Chesterfield.—*R. Flammula* L. var. *serratus* DC. (*C) Cutthorp.—*R. auricomus* L. (L) Bonsall.—*R. arvensis* L. (C) Calow, Newbold, Cutthorp; (*Y) near Ashover Hay.—*Caltha palustris* L. (L) Via Gellia, White Hillocks near Ashover.—*Aquilegia vulgaris* L. (Y) Rowsley.

Castalia alba Wood. (C) Somersall.

Papaver dubium L. (P) Elmton, Scarcliff.—*P. Argemone* L. (C) Boythorpe.—*Chelidonium majus* L. (C) Holymoorside, Old Brampton, Spital.

Corydalis claviculata DC. (C) Chesterfield.—*Fumaria officinalis* L. (P) Bolsover, Scarcliff, Elmton; (C) Spital, Temple Normanton.—†*F. Boraei* Jord. (*C) Spital. (This was recorded on my authority from Brockwell Lane in Linton's *Flora*, Appendix, but was overlooked by Mr. Arthur Bennett in his Supplement to Top. Bot. *E. D.*)

Cheiranthus Cheiri L. (*P) Scarcliff.—*Radicula-Nasturtium-aquaticum* Rendle & Britten, var. *siifolia* (Reichb.). (*P) Langwith; (*L) Miller's Dale.—*Barbarea vulgaris* Ait. (C) Staveley, Wessington, Brimington; (*Y) near Ashover Hay.—*B. intermedia* Bor. (*C) Chesterfield.—*Cardamine amara* L. (C) Wingerworth; (L) White Hillocks near Ashover.—*Draba muralis* L. (L) Eyam.—*Erophila præcox* DC. (L) near Ashover.—*Hesperis matronalis* L. (*C) Walton.—*Sisymbrium officinale* Scop. †var. *leiocarpum* DC. (*P) Bolsover; (*Y) near Ashover Hay; (*L) Bakewell.—*Brassica nigra* Koch. (*C) Chesterfield.—*Lepidium campestre* Br. (C) Linacre; (L.) Bonsal.—*L. Draba* L. (C) Staveley.—*Thlaspis arvense* L. (*P) Cresswell.—*T. virens* Jord. (L) Mill Close lead mines.—*Raphanus Raphanistrum* L. (C) Hasland (white and yellow-flowered); (L) Eyam (white-flowered).

Reseda Luteola L. (C) Chesterfield.

Viola palustris L. (G) Dore Moor, and above Hathersage.—*V. odorata* L. (P) Scarcliff; (C) Walton, Newbold.—*V. hirta* L. (L) Matlock.—*V. sylvestris* Kit. (*Y) near Ashover Hay; (L) Masson.—†*V. Lloydii* Jord. (*C) Norton, Linacre; (*G) Sir William, near Grindleford.—†*V. ruralis* Jord. (*C) Wingerworth.—†*V. obtusifolia* Jord. (*C) Spital, Wingerworth.—†*V. agrestis* Jord. (*C) Linacre, Newbold, Boythorp; (*G) Cathole, Sir William, near Grindleford.—†*V. polychroma* Kerner. (*L) Eyam.—*V. lutea* Huds. †var. *multicaulis* Koch. (*G) Wadshelf; (*L) Eyam.

Silene latifolia Rendle & Britten. (P) Bolsover; (C) Chesterfield, Temple Normanton.—Var. *puberula* (Jord.). (P) Elmton, Scarcliff; (*C) Spital, Calow; (*Y) Baslow; (L) Middleton Dale.—*S. noctiflora* L. (*P) Cresswell.—*Lychnis Githago* Scop. (C) South Wingfield.—*Cerastium semidecandrum* L. (C) Spital;

(L) Alport. — *C. arvense* L. (C) Linacre. — *Sagina apetala* L. (*C) Walton. — *Arenaria trinervia* L. (P) Scarcliff; (C) Somersall, Tapton.—*A. serpyllifolia* L. (P) Scarcliff, Bolsover, Cresswell. —*Spergula arvensis* L. (P) Elmton; (C) Walton, Temple Normanton.—†*S. sativa* Boenn. (*G) Grindleford; (*L) Monyash.—*Claytonia sibirica* L. (*L) Buxton (*Rev. W. W. Mason, B.A.*).—*Montia fontana* L. var. *major* All. (G) Goyt Valley, Cathole.

Hypericum perforatum L. (C) Spital, Walton; (common on this formation, especially on the Lower Coal Measures).—*H. quadrangulum* L. (L) Ashover; (C) Spital. — *H. humifusum* L. (C) Linacre.—*H. pulchrum* L. (C) Walton; (common on this formation).—*H. hirsutum* L. (P) Elmton; (*Y) Barlow.

Malva moschata L. (C) Spital; (*Y) Barlow; (L) Fallgate near Ashover. — †Var. *heterophylla* Lej. (*L) Lathkil Dale. — *M. sylvestris* L. (C) Wessington, Spital.—*M. rotundifolia* L. (P) Bolsover; (G) Northedge, and near Tansley; (L) Ashover.

Linum catharticum L. (G) Cathole; (Y) Haddon. — *L. angustifolium* Huds. (*P) Cresswell.

Geranium pratense L. (*Y) Barlow, and near Castleton; (L). The white-flowered form found at Alport in 1896 has increased in quantity. Growing with it this year occurred several plants with smaller dull purple (not blue) flowers. They were quite fertile, and appear to be only a form of the typical plant.—†*G. pratense* × *Robertianum.* (*L) Lathkill Dale.—*G. dissectum* L. (P) Cresswell, Elmton; (C) Wingfield, Walton, Barlow, Stretton.—*G. pyrenaicum* Burm. fil. (L) Ashford.

Acer campestre L. (C) common round Chesterfield.

Ulex Gallii Planch. (G) Cathole; (L) Over Haddon.— *Medicago sativa* L. (C) Tapton and Chesterfield.—*M. lupulina* L. †var. *Willdenoviana* Koch. (*C) Spital; (*G) near Ashover; (*L) Eyam.—*Melilotus officinalis* Lam. (C) Chesterfield.—*Trifolium pratense* L. var. *sativum* Schreb. (*C) Tapton.—*T. medium* L. (P) Elmton; (C) Staveley, Walton; (G) Wadshelf; (*Y) Barlow.—*T. hybridum* L. (P) Elmton; (C) Linacre, Spital; (very common on the Coal Measures).— *T. procumbens* Sibth. †var. *majus* Koch. (C) Dronfield Woodhouse. — *Anthyllis Vulneraria* L. (C) Spital. —*Lotus uliginosus* Schkuhr. (P) Scarcliff. — *Vicia hirsuta* Gray. (*P) Elmton.—*V. sativa* L. (C) Chesterfield, Dronfield.—*V. angustifolia* L. (*C) Temple Normanton, Wingerworth.—*Lathyrus montanus* Bernh. (C) abundant on this formation. A form with narrowly linear leaflets upwards of two inches in length occurred near Chesterfield.

Prunus Cerasus L. (*C) Tapton.—*P. Padus* L. (*C) Wingerworth.—*Geum rivale* L. (C) Walton; (L) Chee Dale, Monsal Dale. — *Potentilla procumbens* Sibth. (G) Cathole, Sir William near Grindleford. — *Alchemilla vulgaris* L. var. *alpestris* Pohl. (L) Monsal Dale, Lathkill Dale. — *Rosa tomentosa* Sm. (G) above Baslow. — *R. canina* L. var. *lutetiana* (Léman). (*C) Holmesfield; (L) Over Haddon. — Var. *dumalis* (Bechst.). (P) Bolsover; (L) Lathkil Dale.—†Var. *inconspicua* (Déségl.). (*P) Bolsover; (*L) Lathkil Dale. — *R. dumetorum* Thuill. var. *cæsia*

Sm. (*P) Bolsover. — *R. glauca* Vill. var. *subcristata* (Baker). (*P) Bolsover; (G) near Hathersage. — *R. coriifolia* Fr. var. *implexa* (Gren.). (*Y) near Barlow; (G) near Hathersage. — *R. Borreri* Woods, var. *arvatica* (Baker). (*C) Holmesfield. — *Pyrus Aucuparia* Ehrh. (*C) Spital, Tapton, Walton, Wingerworth, Linacre. Common in woods on this formation. — *P. communis* L. (C) near Ambergate. — *Cratægus Oxyacantha* (*oxyacanthoides* Thuill.). (C) Calow. — *C. monogyna* Jacq. var. *laciniata* Wallr. (*C) Calow.

Saxifraga granulata L. (L) Ashover. — *S. hypnoides* L. (L) Middleton-by-Youlgreave. — *Ribes Grossularia* L. (C) Wingerworth; (L) Monsal Dale.—*Sedum purpureum* Tausch. (L) Lathkil Dale.

Drosera rotundifolia L. (G) Cathole.

Lythrum Salicaria L. (C) Chesterfield. Rare on this formation.

Epilobium angustifolium L. (C) Spital, Sheepbridge, Unston. Abundant on the Coal Measures. — *E. hirsutum* L. (C) White-flowered at Spital; abundant, with pale flesh-coloured flowers, not accompanied by any of the typical form, at Barlow. (*Y) near Barlow. — *E. hirsutum* × *parviflorum.* (L) Lathkil Dale, Via Gellia.—*E. parviflorum* Schreb. Wessington, Chesterfield. Common on this formation.—†Var. *rivulare.* (*P) Langwith. — *E. roseum* Schreb. (C) Calow. — *E. obscurum* Schreb. (C) Tapton; (G) Cathole.

Conium maculatum L. (L) Monsal Dale.—*Sium erectum* Huds. (C) Chesterfield, Staveley. — *Pimpinella Saxifraga* L. var. †*dissecta* With. (*C) Spital; (*G) Sir William, near Grindleford; (*L) Youlgreave.—*P. major* Huds. (P) Scarcliff; (*Y) near Milltown. — Var. †*dissecta* N. E. Brown. (*L) Bakewell. — *Myrrhis Odorata* Scop. (L) Alport, Middleton Dale. — *Scandix Pecten-Veneris* L. (P) Stoney Houghton; (C) Linacre.

Anthriscus vulgaris Bernh. (*C) Spital.—*Œnanthe Crocata* L. (*C) Tapton.

Æthusa Cynapium L. (P) Scarcliff; (C) Calow; (L) Youlgreave.—*Angelica sylvestris* L. (G) Cathole.—*Heraclium Sphondylium* L. var. *angustifolium* Huds. (C) Walton Wood; (*Y) near Barlow; (L) Middleton Dale, Bakewell.—*Daucus Carota* L. (C) Spital.

Cornus sanguinea L. (P) Scarcliff, Langwith.

Adoxa Moschatellina L. (C) Chesterfield, Stretton.—*Viburnum Opulus* L. (C) Walton Wood.

Galium verum L. (P) Elmton.

Valeriana officinalis L. (*Mikanii* Syme). (C) Wessington. Much valerian is cultivated in this neighbourhood, and known locally as "Faléry." The plants are brought from the limestone near Mill Close lead mines. The drug is sold and largely exported to the United States. The officinal plant is *V. Mikanii* Syme, and not *V. sambucifolia* Mikan fil., although this latter plant is far more common on the Coal Measures. — *V. sambucifolia* Mikan fil. (C) Linacre Wood. This plant is termed "Cat's Valerian" in

Linton's *Flora*. This name, however, is more applicable to *V. Mikanii* Syme. *V. Mikanii* is much more strongly scented, and Mr. W. Hales, Curator of the Chelsea Physic Garden, tells us that there the cats scratch up the plants of *Mikanii*, leaving *sambucifolia* almost untouched. Mr. E. M. Holmes, however, informs us that where *sambucifolia* is grown alone cats will attack it readily.

Dipsacus sylvestris Huds. (*P) Cresswell. — *Scabiosa Succisa* L. (*P) Scarcliff.—*S. Columbaria* L. (C) Cordwell Valley.

Solidago Virgaurea L. (G) near Baslow; (L) Eyam.—†*Inula Helenium* L. (*C) waste places and in gardens near Wessington, where it is largely cultivated by the cottagers as a drug, and known as "Pānum." — *Bidens cernua* L. (C) Staveley. — *B. tripartita* L. (C) Chesterfield. — *Matricaria suaveolens* Buchenau (*discoidea* DC.). (*C) Boythorp and Chesterfield.—*Artemisia vulgaris* L. (C) abundant on this formation. — *Senecio sylvaticus* L. (G) Cathole.—*S. erucifolius* L. (P) Elmton; (C) Hasland, Temple Normanton, Calow, Cordwell Valley; (*Y) near Baslow.—*Carduus tenuiflorus* Curt. (L) Via Gellia. Not recorded for Derbyshire since 1801.—*C. crispus* L. (L) Wormhill.—Var. *acanthoides* (L.). (L) Wormhill.—*C. crispus* × *nutans*. (L) Lathkil Dale.—*Serratula tinctoria* L. (C) Somersall, Ashgate.—*Centaurea Scabiosa* L. (C) Staveley. — *C. Cyanus* L. (C) Spital. — *Picris hieracioides* L. (L) Via Gellia.—*Crepis capillaris* Wallr. (*virens* L.) var. †*agrestis*. (*C) Spital. — *C. biennis* L. (C) Walton. — †*Taraxacum erythrospermum* Andrz. (*C) Hady; (*G) Sir William near Grindleford; (*L) Over Haddon. — *Lactuca muralis* Gaertn. (C) Ashgate.—*Tragopogon minus* Mill. (P) Scarcliff, Langwith; (C) Chesterfield, Boythorp.—*Hieracium boreale* Fr. (P) Scarcliff.

Calluna vulgaris Hull. (G) Cathole. Strangely enough there is no record given in the *Flora* for this plant on the Southern Division (G_2) of the Grits. It is in reality very abundant on all the moors on the Grits.

Primula veris × *vulgaris*. (L) Middleton Dale. — *Lysimachia nemorum* L. (C) Walton, Wingerworth, Sutton Wood. — *Centaurium umbellatum* Gilib. (*E. Centaurium* Pers.). (P) Elmton; (C) Spital, Sutton Scarsdale.

Gentiana Amarella L. (L) Over Haddon, Arbelow.—*Symphytum officinale* L. (C) Chesterfield; (*Y) near Ashover Hay; (L) Middleton-by-Youlgreave.—*S. peregrinum* Ledeb. (L) near Bakewell.—*Myosotis arvensis* L. var. *umbrosa* Bab. (L) Lathkil Dale.

Borago officinalis L. (C) Spital.

Lycium chinense Mill. (*C) Calow, Spital, Brampton, Stretton, Brimington, Cordwell. Spreading rapidly on the Coal Measures.

Verbascum Thapsus L. (L) Overton, Lathkil Dale.—*V. nigrum* L. (L) Middleton Dale.

Linaria Elatine Mill. (C) Linacre.— *L. repens* Mill. (*G) Bamford (*Dr. W. J. Fordham*).—*L. vulgaris* Mill. (L) Middleton-by-Youlgreave.—*L. minor* Desf. (P) Bolsover; (C) Duckmanton. —*Mimulus Langsdorffii* Donn. (*P) Langwith.—*Veronica scutellata* L. †var. *hirsuta* Weber. (*C) Brackenfield Heath; (*G) Cathole. — *V. Anagallis-aquatica* L. var. *anagalliformis* (Bor.). (L)

Lathkil Dale, Monsal Dale.—*Euphrasia brevipila* Burnat & Gremli. (L) Middleton Dale, Lathkil Dale.—*E. Kerneri* Wettst. (G) Sir William near Grindleford; (L) Over Haddon; (*C) Holmesfield; (*L) Over Haddon.—*E. curta* Wettst. (L) Arbelow.—†*E. borealis* Towns. (*G) East Moor; (*L) Arbelow.—*Lathræa Squamaria* L. (C) Linacre.

Mentha alopecuroides Hull. (*L) Fallgate near Ashover.—*Thymus Serpyllum* L. (P) Bolsover.—*Clinopodium vulgare* L. (P) Elmton.—*Scutellaria galericulata* L. (C) Chesterfield.—*S. minor* Huds. (*G) Cathole.—*Stachys palustris* L. (C) Tapton.—*Galeopsis angustifolia* Ehrh. (*G) Cathole.—*G. speciosa* Mill. (G) Cathole, Sir William near Grindleford.—*G. Tetrahit* L. †var. *bifida* (Boenn). (*P) Elmton; (*C) Tapton, Hasland; (*G) Cathole. This is the common form round Chesterfield. We have not seen true *Tetrahit* on the Coal Measures.—*Ballota nigra* L. (L) Over Haddon.

Plantago major L. (L) Ashford, with leafy scapes, and the lower flowers in the axils of large bracts.—Var. *intermedia* (Gilib.). (L) Ashford.—*P. media* L. (P) Langwith.—*P. lanceolata* L. (L) Ashford. Many-headed; each head in the axil of a leafy bract.

Scleranthus annuus L. (C) Linacre.

Atriplex hastata L. (C) Spital.

†*Rumex domesticus* Hartm. (*C) Hady, Cordwell Valley, Stretton; (*G) Cathole.

Euphorbia exigua L. var. *retusa* L. (C) Spital; (*G) Cathole.

Humulus Lupulus L. (P) Langwith; (C) Wingerworth.—*Urtica dioica* L. †var. *angustifolia* Wimm. & Grab. (*P) Bolsover, Stony Houghton; (*C) near Dronfield; (*Y) Baslow; (*L) Middleton-by-Youlgreave, Lathkil Dale, Bakewell.—*Carpinus Betulus* L. (C) Tapton.

Castanea sativa Mill. (*C) Wingerworth.—*Fagus sylvatica* L. (C) common on the Coal Measures round Chesterfield. Only one locality, "about Renishaw," given in the *Flora*.—*Populus alba* L. (C) Wingerworth; (*Y) near Baslow (probably planted).—†*P. nigra* L. (*C) Wingerworth, Holymoorside. (Mr. Linton, in a letter to me, stated that the plants recorded as *P. nigra* in the *Flora* were not properly distinguished from *P. monilifera*. He wrote that he believed *P. nigra* to be very rare in the county, and asked me to look out for the tree in the Chesterfield district. I am now able to give the two localities mentioned above.—*E. D.*)

Epipactis atroviridis W. R. Linton. (C) Haag Wood.—*Orchis Morio* L. (C) Wingerworth.

Juncus squarrosus L. (G) East Moor, Cathole.—*Luzula pilosa* Willd. (C) Sutton Wood.—*L. multiflora* DC. var. *congesta* Lej. (G) Cathole.

Typha latifolia L. (C) Wingerworth.

Triglochin palustre L. (*Y) Haddon.

Scirpus compressus Pers. (*Y) Haddon.—*Eriophorum angustifolium* Roth. (G) East Moor.—*Carex pulicaris* L. (C) Brackenfield.—*C. paniculata* L. (C) Brimington.—*C. remota* L. (C) Chesterfield, Brimington, Walton.

Phalaris canariensis L. (*C) Tapton, Chesterfield. — *Alopecurus myosuroides* Huds. (*P) Bolsover. — *Phleum pratense* L. var. *nodosum* (L.). (*P) Cresswell; (*C) Spital.—*Agrostis canina* L. (C) Wingerworth Bole Hill. — *A. alba* var. *stolonifera* (L.). (*P) Cresswell, Stony Houghton. — *A. tenuis* Sibth. (*vulgaris* With.). (C) Spital, with awned flowers. — *A. nigra* With. (*C) Spital, Temple Normanton. — *Deschampsia flexuosa* Trin. (*P) Cresswell. *Avena fatua* L. †var. *pilosissima* Gray. (*C) Chesterfield. (*G) near Grindleford. This appears to be the common form in the county. — *Sieglingia decumbens* Bernh. (G) Harewood Grange. — *Poa nemoralis* L. (L) Middleton-by-Youlgreave, Lathkil Dale. — *Glyceria plicata* Fr. (P) Langwith. — *G. aquatica* Wahl. (C) Staveley. — *Festuca pratensis* × *Lolium perenne.* (G) near Grindleford; (*L) Over Haddon. — *Bromus giganteus* L. (P) Scarcliff; (L) Lathkil Dale. — *Lolium italicum* Braun. (C) Chesterfield, Boythorp. — *Agropyron repens* Beauv. var. *barbatum* Duval-Jouve. (P) Elmton, Cresswell, Scarcliff, Langwith; (C) Tapton, Chanderhill; (*L) Over Haddon.—*Nardus stricta* L. (G) Cathole, Harewood Grange.—*Hordeum murinum* L. (C) Chesterfield.

Blechnum Spicant With. (C) Haag Wood.—*Asplenium Ruta-muraria* L. (P) Scarcliff; (C) Ashgate. — *Athyrium Filix fœmina* Roth. (C) Haag Wood.—*Phegopteris Dryopteris* Fée. (*C) Haag Wood; (G) Cathole. — *Ophioglossum vulgatum* L. (C) Wingerworth, Loads. — *Botrychium Lunaria* Sw. (L) White Hillocks near Ashover. — *Equisetum limosum* L. (C) Wingerworth; (G) Cathole.

THE FIRST FUEGIAN COLLECTION.

By R. Morton Middleton, F.L.S.

The eighth volume of Sir Hans Sloane's herbarium consists largely of plants collected by George Handisyd in the Straits of Magellan and elsewhere in the New World about the year 1690.

Of Handisyd himself very little is known. He was surgeon of the East Indiaman 'Modena,' and on intimate terms with Sloane. The 'Modena' mustered as "a hyred ship" in the Royal Navy (apparently for the protection of the south coasts of England and Ireland) on 19 July, 1690, and disappears from the Navy List after 7 March, 1690–1; she was rated in Class 3, carried sixty-four guns and had a crew of three hundred and fifty men. She afterwards carried a cargo of broadcloth from London to Bombay and Surat, sailing from the Downs 16 March, 1691–2, and being delayed at the Cape 19–29 July, 1693.

The only two letters known of George Handisyd's are among the Sloane MSS. in the British Museum (4036, ff. 110, 131), and are addressed to Dr. Sloane at the Duchess of Albemarle's lodgings at St. John's, Clerkenwell. The first is dated "Modina feb: 19 : 169½," and shows that he had just embarked at the Port of

London, "being sent for in all heast on bord to on of our maites who is very ill of a putrid fever." The other, "from on boord y^e^ Modena at Cape Bona Speranze July 27, 1692," proves that he was then trying to collect for Sloane at the Cape ("I hope to incress your stocke especialy as to pla [torn] having maid it my bussines ever since we arivd at this port to looke out for them and also imployd others for y^t^ intent"), but no plants from that voyage appear to be in the National Herbarium.

The specimens in H. S. 8 were most likely collected shortly before July 1690. They are labelled in Sloane's handwriting; autograph tickets from Handisyd are preserved on ff. 12, 26, 86, 115, 117. They include flowering-plants, ferns, mosses, lichens, and sea-weeds; the mosses and lichens are referred to by Sloane in Nat. Hist. Jamaica, i. 65.

The plants are on the whole in good condition. Many are localized, though not always correctly; the localities embrace Tierra del Fuego, Port Falkland, Elizabeth Island, Hawkins Island, Port Famine, Batchelor's River, Cape Quad, and Port Gee; also Juan Fernandez and the Island of "Mucho" (? Mocha). There are also specimens from New England, Hispaniola, and Barbadoes.

This appears to be the earliest collection of plants from the Magellanic region; it contains such characteristic species as *Gunnera magellanica* Lam. and *Fuchsia magellanica* Lam. The specimens of *Drimys Winteri* Forst. (ff. 100, 130, 148) are referred to in Fothergill's "Account of Cortex Winteranus," published in *Medical Observations*, v. 45 (1779); one of them (on f. 100) is the original of the plate in Phil. Trans. (1693), where Sloane gives an interesting account of the plant, drawn up largely from Handisyd's observations.

The cryptogams have been named by Mr. Gepp.

Racomitrium lanuginosum Brid. "This and the following mosses were gathered by Mr. Handisyd on the terra del Fuego side of the str. of Magellan." "This moss was sufficiently distinguished from all others by the smallnesse of the leaves w^ch^ were no bigger than hairs & of a yellowish green colour, besides w^ch^ it had many white haires w^ch^ made it look extremely pretty," f. 3.

Cladonia rangiferina Hoffm. "Brought from the Magellanic straights," f. 4.

Stereocaulon ramulosum Nyl. "This had solid stalks sometimes round sometimes broad & compressd, it was branched into many twiggs & was about 2 inches long, the twiggs had many small subdivided ramifications or leaves all of a whiter colour then arboreus cum orb. C. B. & in some places were small white heads & on the tops those heads were of a scarlett colour." "It was brought from the trees in the streights of Magellan & given me by Mr. George Handisyd," f. 5.

Sticta pulmonaria Ach. "This was brought from the streights of Magellan by Mr. Handisyd. I have seen it w^h^ the muscus crustæ modo, &c., on some large pieces of y^e^ Cortex Peruanus," f. 6.

Cladonia sylvatica Wallr. "This came from y^e^ Magellan streights," f. 7.

Asplenium obtusatum Forst. "This plant Lonchitis was ab^t^ 10 inches long & had a cornered stalk, which had 7 pair of pinnæ situated opposite to one another, they were of a very green colour oblong-roundish ab^t^ one inch in length & ½ as broad, semicircular towards the upper edge & having a sinus on y^e^ under side tow^ds^ the very short footstalk by w^ch^ it was fastened to y^e^ midle ribb, they were indented ab^t^ the edges & had on their backsides ferrugineous lines in w^ch^ lay y^e^ seed, going from the midle ribb of the pinnæ towards the edges." "It grew in the Island of Mucho not far from the Continent of Chili & was thence brought me by Mr. Handisyd," f. 14.

Adiantum chilense Kaulf. "This rises to about 7 or 8 inches high by a cornered stalk w^ch^ towards the top is thinly branched into twiggs who have here and there some few pinnulæ or small leaves like those of ruta muraria being roundish oblong & cutt in their segments being roundish & blunt & not unlike those of the common ruta muraria only lesse & having ferrugineous spotts on the backs of them. The root is made up of many long fibrills drawing their nourishment from the earth. being covered w^h^ ferrugineous hair." "It grew in the Island of Juan Fernandez in the S. Sea whence it was brought and given me by Mr. George Handisyd," f. 18.

Asplenium magellanicum Kaulf. "It grew in the Island of Juan Fernandez in y^e^ S. Seas from whence it was brought & given me by Mr. George Handisyd," ff. 19, 20, 125.6, 7, 8.

Hymenophyllum subtilissimum Kunze. "This & the preceeding are imperfect specimens gathered on terra del fuego side of the streights of Magellan by Mr. Handisyd & given me," f. 21.

H. tortuosum Hook. & Grev. "Præcedentis varietas," f. 22.

Calystegia Soldanella R. Br. "From Magellan streights," ff. 27, 132, 1. This plant does not appear to have been reported from the Magellanic region. The most southerly specimen in Herb. Mus. Brit. is one collected by the writer at the mouth of the Rio Imperial, about 1000 miles further north. It is not recorded by Johow in his *Flora de las Islas de Juan Fernandez.* Perhaps Handisyd got it in the Island of Mocha.

Caltha appendiculata Pers. "This came from Batchelors river in the Mag. str.," ff. 29, 127.3.

Solanum tuberosum L. "Gentianella rotundifolia multiflora? e Freto Magellanico," f. 30. This and the fragment on f. 60 are of great interest as early specimens of the wild potato, but there appears to be no other record of the plant being found south of the Chonos Archipelago, where Darwin collected it. It is frequent on the banks of "esteros," about 38·° S lat., and may, therefore, have come from Juan Fernandez or Mocha. "At Port Falkland in Magell. str. Solanum vulgare?" f. 60. This is part only of a single leaf, but there is enough to show that it is not the form with narrow leaflets, endemic in Juan Fernandez, and known

as *S. fernandeziana* Philippi. The ordinary "wild" *S. tuberosum* L. has, however, long been known in that island.

Sisyrinchium sp. "e Freto Magellanico," f. 32.

Culcitium magellanicum Hombr. et Jacq. "From Rocky ground at Port Falkland in Magellan str.," ff. 41, 116.2, 147.2.

Valeriana lapathifolia Vahl. "This was found at Port Falkland in Magellan straits," ff. 42, 145.1.

V. carnosa Smith. "At Batchelors river in Magellan straits," ff. 43, 107.2.

Osmorhiza chilensis Hook. & Arn. "This grew at a place calld Batchelors river in Magellan straits 6 or 7 foot high." "Cicutaria maxima & altissima," ff. 44, 144.2.

Cochranea conferta Miers. "This had yellow flowrs & was gathered at Port Famine in Magellan straits," ff. 48, 130.1. There is clearly a mistake here, as the species is a native of the dry central and northern parts of Chile (Quillota, Llaillai, Coquimbo, &c.).

Phacelia circinata Jacq. "This was gathered in the Magellan straits near Elizabeths Island," ff. 49, 116.3.

Luzuriaga marginata B. & H. "This grew in the woods on the mountains by Port Falkland. it has an Hexapetalous white flowr," ff. 51, 116.4.

Calceolaria plantaginea Sm. "From Port Falkland. Gramen Parnassi foliis dentatis," ff. 52, 127.4.

[*Geranium maculatum* L. "This was found at Cape Quad," f. 57. Cape Quad is on the north or Patagonian side of the Straits of Magellan, but the specimen appears to be the North American plant, and was probably brought from New England.]

[*Linnæa borealis* L. "This I take to be a nummularia describ'd by Bartholine to grow in Norway. It came from the Magellanic straits by Mr. Handisyd," f. 58. No doubt from North America, Handisyd's memory being again at fault. Also f. 144.3 in part.]

Gunnera magellanica Lam. "This was found at Port Falkland in Magell. str. it seems to be y^e^ same with the Chamærubus," ff. 61, 105.4, 148.2.

Baccharis magellanica Pers. "E freto magellanico?" ff. 62, 151.3

Sisyrinchium junceum E. Meyer. "From Batchelors river in Mag. str.," f. 63.

Rostkovia magellanica Hook. fil. "This grew in marish grounds ab^t^ Batchelors river in Mag. str.," ff. 65, 130.2.

Primula farinosa L. *β magellanica* Hook. f. "At Batchelors river in Magell. str.," f. 66.

Sisyrinchium iridifolium H. B. K. "From Batchelors river in Mag. str.," f. 68.

Cnicus lanceolatus Willd. "This grew in the Island Mucho in the S. seas of the Coast of Chile," f. 70.

Acæna adscendens Vahl. "From the W. part of terra del Fuego at a place called Port Gee," ff. 72, 130.3.

Eryngium paniculatum Lar. "Aloe foliis arundinaceis mar-

ginibus spinosis, e Freto Magellanico?" f. 71. Leaf only; a Chilean species, found also in Brazil, Paraguay, &c. "In Marish grounds on the Island Mucho not far from Chile," f. 73. Probably the same species; a small flowering-branch only. It is not unlikely that this and the leaf on f. 71 were collected at the same time on the Island of Mocha. Also f. 144.4.

Chiliotrichum amelloides Cass. "This has yellow flowrs. It grew in the Marishes on the Mountains by Port Falkland," f. 75.

Erigeron sp. "At Batchelors river in Magellan streights," f. 77.

Perezia recurvata Less. "On terra del Fuego at Port Gee. Carlina minima," ff. 78, 113.4.

Armeria chilensis Boiss. "E freto Magellanico?" f. 80.

Senecio candidans DC. "At the first narrow of the Streits of Magellan," ff. 81, 137.2.

Erigeron alpinum L. "E Freto Magellanico?" f. 82.

Baccharis patagonica Hook. & Arn. "At Port Falkland in Mag. str.," ff. 85, 150.2.

Gnaphalium falcatum Lam. "This was found at Batchelors river on dry ground," ff. 89, 116.7.

Peumus Boldus Mol. "Suberis folio arbor floribus racemosis. E freto Magellanico," ff. 90, 107.4. The locality is in somewhat darker ink than the rest, and may have been added later by Sloane from memory. This small tree does not occur in the Magellanic region nor in the islands of Juan Fernandez, but it abounds on the mainland of Chile opposite Mocha, and may have been collected in that island.

Drimys Winteri Forst. "The true cortex Winteranus see the phil Transact. Laurifolia Magellanica cortice acri," f. 100. There are on this page three specimens, of which the smallest is of historic interest, as being that figured in Phil. Trans. xvii. No. 204, Oct. 1693, and described on p. 922 under the title, "An Account of the true Cortex Winteranus, and the Tree that bears it. By Hans Sloan, M.D. and S.R.S." No locality is given in the hortus siccus. Further examples occur on ff. 130.5 and 148.4.

Myrtus nummularia Poir. "From the first narrow in y^{e} Magellan str.," ff. 102, 137.3.

Donatia fascicularis Forst. "e Freto Magellanico," f. 103. A minute fragment measuring 15 by 12 mm. Also f. 105.7.

Nanodea muscosa Gaertn. "This bears a berry as bigg as an haw red smooth at top. It grows on mountains amongst grasse by Springs," f. 104.

Berberis ilicifolia Forst. "This which Mr. Handisyd said was an Holly grows in the str. of Magell. & there are made of it their arrows," ff. 108, 145.8.

Desfontainea spinosa Ruiz & Pav. "It grows 5 or 6 foot high of a light green colour, blossom of a curious yellow w^{t} ane eye of red & after comes ane ovall berry ab^{t} y^{e} bignesse of a hasell nutt, having many seeds. growes in dry grounds on y^{e} tops of mountains," ff. 107.8, 109.

Aralia lætevirens Gay. "This Mr. Handisyd gatherd at Cape

Quad he call'd it Cinquefoil tree, it smelt strong has a racemose flour berries as bigg as filberds which are insipid and contain many seeds in them," ff. 112, 135.4, 145.3, 149.5.

Maytenus magellanicus Hook. f. "This was gathered at Elizabeths Island, Mag. str.," ff. 114, 145.9.

Berberis buxifolia Lam. "Magellan straits." A label of rough paper explains in Handisyd's writing that the plant bears "a blew oval bery like an hucklebery of a pleasent subacid taste q^{ch} make good tartes the busshe—of 7 or about 8 or 9 foot high," f. 117.

Philesia buxifolia Lam. "e freto Magellanico," ff. 118, 116.5, 147.7.

Veronica elliptica Forst. "This was found by Mr. Handisyd at Port famine in Magellan streights," f. 122.

Fuchsia magellanica Lam. "This Mr. Handisyd gathered in the streights of Magellan. It bears a figg as he told me which was eatable on it fed blackbirds it grew to the heighth of a small tree, it had a green bark & brittle wood," ff. 128, 105.6, 148.3.

Chiliotrichum cf. *amelloides* Cass. Ff. 142.3, 150.1. Without flower or locality.

CATHARINEA RHYSTOPHYLLA C. M.

By H. N. Dixon, M.A., F.L.S.

The discovery of *Catharinea rhystophylla* C. M. in Ireland, as recorded in the March issue, naturally led to a comparison with its allied species, and the attempt to discriminate between it and *C. angustata* soon made it clear that a critical examination of the two plants was necessary. For purposes of comparison I have had the following material and literature:—The original description of *Catharinea rhystophylla* by C. Müller (Nuov. Giorn. Bot. Ital., 1896, 93); the article by E. S. Salmon on *C. Henryi*, sp. nov. (Journ. Bot. 1902, 1), in which he compares and gives two figures of *C. rhystophylla*; the original fruiting specimen cited by him in that article, leg. Giraldi, 1895, now in the Kew Herbarium; a further specimen (of the male plant) from Hiu-qua-san, China, leg. Giraldi, 1897, and determined by C. Müller; and another specimen in fruit, leg. Giraldi, 1897, from a neighbouring locality, kindly sent me by Mons. Cardot.

In C. Müller's description of *C. rhystophylla* no character is given of either vegetative or fruiting organs indicative of any difference from *C. angustata*, unless it be that of the leaves "distincte transversaliter undulata," "dorso summitatis pariter simpliciter vel duplicate aculeata," and the note, "A congeneribus foliis eleganter transversali-rugulosis primo visu distincta." The latter sentence is rather enigmatical, since it apparently overlooks *C. undulata*, which is usually considered the type of the genus! It may have been intended to apply to the dioicous species only; but even then it is singularly inaccurate, as there are several other

dioicous species with the leaves transversely undulate. At the most, then, the characters indicated by C. Müller imply that the only difference from *C. angustata* would lie in the strongly undulated, rugulose leaves, spinose at back of lamina. Is there anything in this inconsistent with *C. angustata ?* Many authors, it is true, speak of the leaves of *C. angustata* as less undulate and less spinose at back than in *C. undulata* (*e.g.* Limpricht, "kaum querwellig, . . . Rücken der Lamina spärlich mit einfachen Zähnen besetzt"); on the other hand, an equal number in comparing it with that species indicate no difference at all in the undulation of the leaves, nor do they always describe them as less toothed at back, the fact being that *C. angustata* exhibits a considerable amount of variation in this respect.

Salmon (*loc. cit.*) compares his new species, *C. Henryi*, both with *C. angustata* and *C. rhystophylla*, giving measurements of cells, &c. The measurements of the cells of *C. rhystophylla*, and of the two figures given in the plate, apply equally well to *C. angustata*, and so far as they go, therefore, independently support the view of the identity of the two species. A careful comparison of the material available entirely confirmed this conclusion. I find in all the specimens of *C. rhystophylla* examined an exact agreement with *C. angustata* in fruiting characters, in the structure of the male flower, in size of cells, and in number and structure of lamellæ. From the most extreme forms of *C. angustata* (as compared with *C. undulata*), having the leaves pellucid, slightly undulate only and faintly spinose at back, with the border comparatively weakly toothed and only in upper half of leaf, *C. rhystophylla* indeed presents a somewhat strikingly different appearance; the areolation is rather obscure, the leaves strikingly undulate and rugose, strongly set with short, obtuse or acute spinules at back, and with the border more strongly spinose and for a greater distance down the leaf. But an examination of a considerable series of *C. angustata* at once reduces these apparently substantial differences to a minimum. The two forms are but the extremes of a series of gradations presented by *C. angustata*.

For example, the fruiting plant of *C. angustata* gathered by Messrs. Holmes and Nicholson in Bedgbury Wood, Kent, 1898, exhibits an intermediate stage between the two extremes; the marginal toothing is that of typical *angustata*, but the leaves are closely and strongly undulate, strongly spinose at back, and the areolation obscure. A plant gathered by Mr. Nicholson and myself in South Tyrol in 1904 presents almost identical characters. Another specimen of *C. angustata* collected by Mr. Nicholson on Turner's Hill, Sussex, Nov. 1901, has still more rugose, spinose leaves, and differs little or not at all from *C. rhystophylla*; while a fruiting plant of *C. angustata*, from the Austrian coast of the Adriatic (leg. Leitlesberger), has leaves which, for the development of their rugosity and the asperity of their armature, outdo the most ferocious forms of *C. rhystophylla* itself!

In fine, there is no line of demarcation between the *C. rhystophylla* of C. Müller and the extreme form of *C. angustata* as described by Limpricht; and I have no hesitation whatever in concluding that it must take rank as a variety at most of *C. angustata*. The variation indeed, at best, is scarcely if at all greater than is presented within the range of *C. undulata*.

The extreme forms are so distinct in the appearance of the leaves from typical *angustata* that they seem quite deserving of varietal rank, and I treat them therefore as such, while recognizing that it is quite impossible to define the variety in any terms which will not leave a certain number of plants in that limbo which is so characteristic of Nature and so terribly inconvenient for the herbarium.

I should refer the following plants, at least, to the variety :—

C. ANGUSTATA Brid. var. RHYSTOPHYLLA (C. M.) mihi. Folia transversaliter rugoso-undulata, lamina dorso spinis prædita, limbo infra medium dentato, in parte superiore argutius spinoso, areolatio obscura.

China (Shen-si): varr. locc., sub nomine *C. rhystophyllæ*, 1895, *et sqq.*

Austria : Coglio, leg. Leitlesberger (comm. Dr. Bouly de Lesdain), 1900.

England : Bedgbury, Kent, leg. Holmes and Nicholson, 1898 Turner's Hill, Sussex, leg. W. E. Nicholson, 1908.

Ireland: Saintfield Demesne, Co. Down, leg. Canon Lett, 1908

ALABASTRA DIVERSA.—PART XVIII.

BY SPENCER LE M. MOORE, B.Sc., F.L.S.

1. NEW OR RARE ASCLEPIADEÆ FROM TROPICAL AFRICA.

Cryptolepis Gossweileri, sp. nov. Fruticulus spithameus caulibus ex rhizomate crasso oriundis abbreviatis verisimiliter annotinis validis cinereo-corticatis ramulos plures ascendentes crebro foliosos puberulos gignentibus, foliis oppositis vel alternis pro rata parvis brevipetiolatis ovato-suborbicularibus utrinque rotundatis apice ipso subito acutatis utrobique similiter griseo-viridibus tenuiter membranaceis costa media obscure puberula exempta glabris, cymis terminalibus folia plerumque excedentibus plurifloris puberulis, bracteis subulatis pedicellis brevioribus subæquilongisve, calycis lobis oblongo-lanceolatis obtusis extus puberulis, corollæ ultra medium divisæ tubo calycem breviter excedente sinubus truncatis calvis lobis oblongis obtusis, coronæ phyllis abbreviatis subulatis prope basin corollæ tubo insertis, antheris acuminatis stylum breviter excedentibus.

Hab. Angola; *Gossweiler*, 3428.

Rhizoma fibrillas complures elongatas filiformes aliquanto aufractuosas emittens. Folia 1·5–2 cm. long., 1·3–1·8 cm. lat. ; petioli 1–2 mm. long. Cymæ profecto evolutæ 2·5–3 cm. long., et

totidem diam. Pedicelli sæpius 2–4 mm. long., bracteæ 2–3 mm. Flores verisimiliter rosei. Calycis lobi 3·5 mm. long. Corollæ tubus 5·5 mm., lobi 7·5 mm. long. Coronæ phylla ·4 mm. long. Antheræ loculi ·75 mm. long., horum acumen ·75 mm.

Apparently nearest *C. microphylla* Baill., but different in habit, leaf, inflorescence, &c. In appearance it looks rather like *Raphionacme divaricata* Harv.

There are no notes upon the ticket accompanying the specimen.

Xysmalobium patulum, sp. nov. Sesquispithameum caule ascendente plurifolioso pubescente mox puberulo, foliis sessilibus vel fere sessilibus (jugis infimis spec. unici nobis solummodo obvii petiolis 5 mm. long. insidentibus) anguste ovato-oblongis obtuse acutis basi obtusissimis leviterve cordatis margine aliquanto crispulis papyraceis costa media utrinque puberula exempta glabris in sicco dilute viridibus, umbellis paucis interpetiolaribus sessilibus circa 5-floris, pedicellis quam folia multo brevioribus pubescentibus, calycis lobis anguste lineari-lanceolatis acutis obtusiusculisve dorso obscure puberulis margine leviter ciliolatis apice fuscis, corollæ lobis calycem duplo excedentibus anguste ovato-oblongis obtusis vel emarginatis patulis glabris, coronæ phyllis ex columnæ stamineæ basi oriundis eamque vix æquantibus leviter complanatis oblongis obtusis dimidio abaxiali intus crista crassa in dentem carnosum transeunte instructis, antherarum alis mediocriter eminentibus appendicibus suborbicularibus in stigma crassissimum breviter impendentibus.

Hab. N.W. Rhodesia, under trees at the Katinina Hills; *Kässner*, with 2167.

Folia 4–5 cm. long., summum 1·2 cm. lat.; costa media subtus maxime prominens, costularum rete apertum nullo negotio aspectabili; petioli dum adsint 1 mm. long., pubescentes. Pedicelli ± 5 mm. long. Flores pansi circa 7 mm. diam., probabiliter virides. Calycis lobi ægre 2·5 mm., corollæ lobi 5 mm. long. Coronæ phylla 2·25 cm. long. Columna staminea 2·5 mm. long.; antherarum appendices ·6 × 1 mm. Stigma 1·6 mm. diam.

Appearance much that of broad-leaved forms of *X. reticulatum* N. E. Br., but the corolla-lobes are not reflexed, and the coronal leaves are dissimilar. The position of this species is next *X. andongense* Hiern.

Xysmalobium rhodesianum, sp. nov. Caule fere bispithameo erecto subdistanter folioso secus lineas duas pubescente deinde glabro, foliis sat elongatis anguste lineari-oblongis utrinque gradatim angustatis manifeste etsi breviter petiolatis margine sæpe leviter undulatis apicem versus nonnunquam obscurissime denticulatis papyraceis utrinque fere glabris, floribus pro rata parvis in umbellis interpetiolaribus sessilibus sæpissime 5–7-floris racemosim digestis, pedicellis quam folia multo brevioribus pubescentibus, calycis lobis lineari-lanceolatis acutis margine ciliolatis, corollæ lobis patulis oblongo-ovatis obtusis calycem paullulum excedentibus, coronæ phyllis columnæ stamineæ basi affixis antherarum culmen leviter superantibus anguste oblongo-obovatis obtusis basi

dorso paullo crassis aliquanto complanatis intus planis, antherarum alis satis prominulis appendicibus deltoideo-suborbicularibus supra stigma inflexis.

Hab. N.W. Rhodesia, Chibanga Stream, under trees; *Kässner*, 2079.

Folia adulta 6-7·5 cm. long., 5-8 mm. lat., in sicco griseo-viridia; petioli circa 3 mm. long. Pedicelli raro ultra 5 mm. long. Flores verisimiliter virides, pansi humectati circa 7 mm. diam. Calycis lobi 4 mm. long. Corollæ tubus 1 mm. long.; lobi 4·5 mm. long. verisimiliter livide purpurei. Coronæ phylla 2·5 mm. long. Columna staminea 2 mm. long.; antherarum appendices ·75 × 1·2 mm.

Near the last described, but the leaves and corona are different.

X. sessile Decne. in DC. Prodr. viii. p. 519.

Hab. N.W. Rhodesia, Malangushi River, under trees; Congo Free State, Kitimbo; *Kässner*, 2065, 2324.

The identification was surmised from the clavis of *Xysmalobium* in Fl. Trop. Afr. iv. i. p. 300, and Mr. N. E. Brown was good enough to dissect, at my request, a flower with one from the type at Paris communicated to Kew. The two flowers he found identical, the only differences between the plants being that whereas the type has a tomentose stem and midrib of leaf, the stem and midrib of the other are at most pubescent.

Xysmalobium speciosum, sp. nov. Planta semimetralis caule erecto satis valido sursum plurifolioso puberulo deinde glabro, foliis oblongis vel anguste oblongo-obovatis apice rotundatis ipso mucronatis basi in petiolum brevem coarctatis membranaceo-coriaceis glabris, floribus pro rata magnis in umbellis interpetiolaribus pedunculatis 3–4-floris dispositis, pedunculis quam folia multo brevioribus ut pedicelli satis elongati gracilibus necnon puberulis, bracteis filiformi-subulatis a pedicellis longe superatis, calycis lobis anguste oblongo-oblanceolatis obtusis glabris, corollæ alte partitæ lobis erectis oblongo-obovatis obtusissimis utrinsecus glabris, coronæ phyllis crassis infra antheras ex columnæ staminеæ apice oriundis antheras longe superantibus deorsum oblongis sursum attenuatis conniventibus insigniter clavatis, antherarum alis mediocriter prominentibus appendicibus rotundatis supra stigma planum inflexis.

Hab. N.W. Rhodesia, Lisanga Spruit, in open ground; *Kässner*, 2144.

Folia 6–7·5 cm. long., 2–3·2 cm. lat.; costa media subtus optime eminens; ord. sec. costæ numerosæ, patentes; petioli 3–6 mm. long., canaliculati. Pedunculi summum 1·2 cm. long. Bracteæ 5–7 mm., pedicelli 1·8–2·8 cm. long. Flores punicei. Calycis lobi fere 1 cm. long. Corollæ tubus 4 mm. long.; lobi 4 cm. long., paullo supra basin 1 cm., medio 2·2 cm. lat. Coronæ phylla ad 7 mm. supra basin columnæ staminæ inserta, 11 mm. long.: pars basalis antheris æquilonga, 4·5 mm. long., pars apicalis 6·5 mm. long., canaliculata. Antherarum appendices 2 × 2·25 mm. Pollinia oblongo-pyriformia, 1·25 mm. long.; caudiculæ ·75 mm., glandula ·3 mm. long. Stigma 3 mm. diam.

To be inserted in the genus next *X. Cecilæ* N. E. Br., which has *inter alia* markedly smaller yellowish green flowers and shorter coronal leaves not greatly narrowed in their middle course and strongly clavate above.

Asclepias Browniana, sp. nov. Herba adusque ¾ metralis caule erecto valido e rhizomate satis crasso radices robustas emittente oriundo sursum bene folioso sparsim pubescente vel puberulo, foliis breviter petiolatis oblongis vel anguste ovato-oblongis apice obtuse acutis basi leviter cordatis crassiusculis utrinsecus scabridis margine scabride ciliatis in sicco griseo-viridibus costis secundariis numerosis plus minus horizontalibus aufractuosis, umbellis paucis (interdum solitariis) extra-axillaribus longipedunculatis 6–8-floris, pedunculis folia excedentibus sparsim pubescentibus puberulisve, floribus pedicellis manifestis fultis majusculis, bracteis linearisetaceis piloso-pubescentibus, calycis lobis anguste lineari-oblongis acutis extus sparsim piloso-pubescentibus, corollæ glabræ fere ad basin usque divisæ lobis late obovato-oblongis obtusis, coronæ phyllis paullo supra basin columnæ stamineæ affixis columnam staminеam excedentibus radiatis basi crassis obtusissimisque superne quadrato-panduratis marginibus inflexis apice obtusis margine terminali utrinque in dentem late triangularem columnæ stamineæ breviter applicatum producto intus papillosis dente carentibus, antherarum alis prominentibus.

Hab. Congo Free State, Kitimbo and Lake Moero; *Kässner*, 2307, 2806.

Folia 5·5–9·5 cm. long., basin versus 2·5–3·5 cm. lat. costa media subtus crassa valde prominens. Pedunculi erecti, inferiores 10–12 cm. long., superiores 7–9 cm. Bracteæ 5–10 mm. long. Pedicelli circa 1·5 cm. long. Calycis lobi 9–11 mm. long. Corollæ lobi patentes, 1·5 × 1 cm. Coronæ phylla 6·5 mm. long., juxta basin circa 3 mm. crass. (i.e., a latere visa); horum pars terminalis 2·5 mm. long.; dentes laterales 1·5 mm. long. Antherarum alæ 3·3 mm. long. Columna staminea ægre 5 mm. alt. Pollinia quadrato-pyriformia, 1·2 mm. long.; caudiculæ arcuatæ, ·75 mm. long.; glandula ·5 mm. long.

The chief difference between this and *A. conspicua* N. E. Br. resides in the shorter and much thicker (as seen in side-view) coronal leaves of the former with a shorter and relatively broader terminal portion.

Named in compliment to my friend Mr. N. E. Brown, who has again in connection with the present paper given me the benefit of his knowledge of African *Asclepiadeæ*.

Asclepias inflexa, sp. nov. Bispithamea caule ascendente sat robusto superne folioso scabriuscule pubescente deinde glabro, foliis manifeste petiolatis late oblongis obtusis apice mucronatis basi truncato-rotundatis rigide membranaceis utrinque scabriusculis in sicco dilutius viridibus, floribus mediocribus in umbellis perpaucis axillaribus vel pseudoterminalibus pedunculatis circa 8-floris digestis, pedunculis sat longis ut pedicelli quam se ipsi breviores pubescentibus, bracteis lineari-subulatis pedicellis brevioribus, calycis lobis angustissime lineari-lanceolatis acutis pube-

scentibus, corollæ alte partitæ lobis late ovato-oblongis obtusis margine ciliolatis crassiusculis glabris, coronæ phyllis columnæ stamineæ ad 1·5 mm. supra basin insertis parte basali antheris æquialta complicato-cucullata margine superiori undulata intus ad apicem linea transversa papillosa instructa parte apicali quam pars basalis breviore oblonga obtusa supra stigma incurva concava intus minutissime papillosa, antherarum alis ima basi breviter productis appendicibus rotundatis crispulis supra stigma inflexis.

Hab. N.W. Rhodesia, Makango Spruit, under trees; *Kässner*, 2207.

Folia 6–7 cm. long., 2–2·8 cm. lat.; costa media supra plana, subtus valde prominens; costæ secundariæ utrinque 14–16, aliæ ascendentes aliæ ascendenti-patulæ; petioli 5–7 mm. long., puberuli. Pedunculi 2·5–4 cm. long. Bracteæ circa 1 cm. long., pubescentes. Pedicelli 1–1·3 cm. long. Calycis lobi 1 cm. long. Corollæ verisimiliter dilute viridis lobis 12 × 8 mm. Coronæ phylla 6·5 mm. long.; pars basalis 4·5 mm. long., a latere visa 3 mm. lat.; pars apicalis 2 mm. long. Columna staminea (antheris haud exemptis) 6 mm. long. Antherarum appendices 1·5 × 1·5 mm. Pollinia quadrato-pyriformia, 1·2 mm. long.; caudiculæ valde curvatæ, sub polliniis dilatatæ, ·7 mm. long.; glandula ·5 mm. long.

The position of this seems to be next *A. robusta* N. E. Br., but there are many important differences in the flowers of the two species.

Asclepias nemorensis, sp. nov. Caule e rhizomate anguste tuberoso ascendente distanter folioso glabro, foliis elongatis linearibus acutis basi obtusis crassiusculis utrinque glabris, umbellis paucis interpetiolaribus pedunculis quam folia plane brevioribus suffultis summis subsessilibus omnibus bifloris, floribus majusculis, pedicellis floribus longioribus ut pedunculi puberulis vel fere glabris, calycis lobis oblongo-lanceolatis acutis a corolla longe superatis minutissime puberulis, corollæ alte divisæ lobis oblongo-obovatis obtusissimis glabris, coronæ phyllis columnæ stamineæ medio insertis crassiusculis dimidio inferiore ambitu suborbicularibus sursum in rostrum obtusum columnam stamineam bene excedens in stigmateque impendens desinentibus dorso extus basi late carinatis intus crista brevi infra medium auctis lateribus complicatis juxta medium dente brevi instructis, antherarum appendicibus suborbicularibus supra stigma inflexis.

Hab. N.W. Rhodesia, Chibenga Stream, under trees; *Kässner*, 2078.

Planta semimetralis. Caulis sat tener, longitrorsum striatulus, hac atque illac puberulus ceterum glaber. Folia usque ad 12·5 cm. long., modice vero 8–10 cm., 3–5 mm. lat.; costa media supra minime perspicua, subtus incrassata. Pedunculi 1 cm. long., umbellorum summorum equidem modo 1–2 mm. Bracteæ filiformes vel lineares, 3–4 mm. long. Pedicelli 1·2–1·7 cm. long. Calycis lobi 6 mm. long. Corollæ tubus 3 mm. long.; lobi 14 × 8 mm. Coronæ phylla 4·5 mm. long.; pars basalis 2 mm., pars rostrata 2·5 mm. long. Columna staminea (antheris inclusis)

4 mm. long. Antherarum appendices 1·2 × 1·3 mm. Pollinia oblongo-pyriformia, ·6 mm. long.; caudiculæ ·5 mm. long., glandula ·2 mm. Stigma 1·2 mm. diam.

Near *A. Randii* S. Moore and *A. eminens* Schlechter, but abundantly distinct from both. The appearance is a good deal that of some species of *Pachycarpus*, e. g. *P. Gerrardi* N. E. Br.

Asclepias reflexa Britten & Rendle var. LONGICAUDA, var. nov. A typo discrepat ob coronæ phyllarum partem terminalem anguste lanceolatam (nec oblongam) sursum attenuatam 6·5 mm. long.

Hab. Congo Free State, Katenina Hills and the Luenda River; *Kässner*, 2183, 2417.

Except for the longer and narrower coronal leaves, I can see no difference between this and the type.

A. pulchella N. E. Br. in Fl. Trop. Afr. iv. i. p. 346.

Hab. N.W. Rhodesia, Kankasa Stream; *Kässner*, 2091.

Excellent specimens of this very rare and beautiful plant, which was described many years ago by Decaisne and has not been found again until now.

The underground part of the stem is a fusiform tuber 2·5–3 × 1·2–1·3 cm., surmounted by a narrowed portion of about the same length, and 1–2 mm. in thickness. The tallest specimens are 30–35 cm. high.

Sphærocodon angolensis, sp. nov. Fruticulus fere bispithameus ramulis e caule abbreviato satis valido erectis simplicibus vel subsimplicibus crebro foliosis pubescentibus deinde glabrescentibus, foliis brevipetiolatis ovato-oblongis vel anguste oblongo-obovatis obtusis vel obtusiusculis basi obtusis obtusissimisve utrinsecus cito glabris, umbellis vulgo 2–4-floris pedunculis gracilibus pubescentibus folia raro excedentibus fultis, pedicellis filiformibus pedunculo sæpissime brevioribus puberulis, calycis lobis lanceolato-oblongis acutis fere omnino glabris, corollæ alte partitæ lobis ovato-oblongis obtusis, coronæ phyllis columnæ staminæ insertis minimis lanceolatis acutis haud bilateraliter compressis, stylo medio concavo antheras haud superante.

Hab. Angola, Kutchi; *Gossweiler*, 4124.

Folia vulgo 2·5–3 cm. long., 1–1·4 cm. lat., papyracea, in sicco grisea; petioli 1–2 mm. long., pubescentes. Pedunculi rarissime 3 cm., solemniter 1–1·5 cm. long., ascendentes. Bracteæ lineari-lanceolatæ linearesve, puberulæ, 2–7 mm. long. Pedicelli 6–10 mm. long. Flores in sicco fusci. Calycis lobi vix 2 mm. long. Corollæ leviter puberulæ tubus paullulum ultra 1 mm. long.; lobi 3 mm. long., medio 1·5 mm. lat. Coronæ phylla ad ·75 mm. a basi columnæ staminæ inserta, ·25 mm. long. Antherarum loculi ·4 mm. long. Glandula linearis, circa ·1 mm. long.; caudiculæ ad normam generis tenerrimæ, glandulæ æquilongæ; pollinia anguste fusiformia, ·3 mm. long.

Differs from *S. melananthus* N. E. Br. in the relatively broader leaves, the shorter pedicels, smaller flowers, shorter and narrower corolla-lobes, minute coronal leaves not flattened laterally, and small anthers.

(To be continued.)

SOME SUTHERLAND PLANTS.

By Rev. E. S. Marshall, F.L.S., and W. A. Shoolbred, F.L.S.

We spent the inside of a week, last July, at Oykell Bridge, v.-c 107 E. Sutherland, and a fortnight at Inchnadamph, v.-c. 108 W. Sutherland, a beautiful place which had already been well explored and produces several rarities. Our work was chiefly with critical forms, especially of *Hieracium*, in the determination of which we have had the most valuable help from Rev. E. F. Linton; our thanks are also due to Rev. Augustin Ley and Mr. W. H. Beeby. New vicecomital records are starred.

Subularia aquatica L. 108. Pools near the mouth of the Loanan River.

Cerastium arcticum Lange. One fine specimen was found on the north-east side of Conival; it must therefore be credited to 107* E. Sutherland.

Arenaria norvegica Gunn. 108. A new station, doubtless its headquarters, was discovered on limestone rocks above Loch Maol-a-Choire, between 1000 and 1200 ft.

Rubus fissus Lindl. 107.* Oykell Bridge.

Rosa mollis Sm. var. **coerulea* Woods. 108. Inchnadamph. —*R. omissa* Déségl. var. *submollis* (Ley). 108. Specimens found at Kylesku in 1890 have been placed here by Mr. Ley.—*R. suberecta* Ley. This beautiful and characteristic rose is evidently one of the commonest in Sutherland. Professor Dingler, of Aschaffenburg, Bavaria, writes that it is "clearly a *tomentosa* Sm. (as a *species collectiva* or Linnean species). I do not know a form like it with us. It may perhaps come between *cuspidatoides* Crépin (or *umbelliflora* (Swartz) Scheutz) and *venusta* Scheutz." 107. Invershin; Oykell Bridge. 108. Inchnadamph; Kylesku, abundant; Lochinver, 1890; Betty Hill, 1897.—Var. *glabrata* Ley. 108.* Betty Hill, 1897 (named by Mr. Ley); it was noted as being rather frequent there.—*R. uncinata* Ley. 108. Coast near Coalbackie, Tongue, 1897; determined by Mr. Ley.—*R. glauca* Vill. 107. Oykell Bridge. 108. Inchnadamph; Kylesku. An Inchnadamph plant is considered by Professor Dingler to be "a variety which somewhat approaches the var. *Mayeri* H. Braun (*Synopsis* vi. p. 187), though departing from that by its more or less compound toothing."

Drosera longifolia L. (*intermedia* Drev. & Hayne). 108.* South shore of Loch Assynt. New for Sutherland; recorded from Caithness.

Epilobium angustifolium L. 107.* Allt Tarsuinn, near Oykell Bridge.

Arctium minus Bernh. (segregate). 107.* Invershin.

Hieracium anglicum Fr. var. *acutifolium* Backh. 108. Local on the limestone near Inchnadamph; rather a broad-leaved form, but well matching some of the Braemar plants.—Var. *cerinthiforme* Backh. 107.* Chonaghair Burn and its tributaries, near Oykell Bridge. 108.* Abundant on the limestone about Inchnadamph;

Unapool Burn, near Kylesku. Though often normal, it varies much in foliage in these northern regions; the leaves are frequently longer and narrower than usual, so that it simulates the habit of subalpine *H. iricum*, and the styles almost yellow.—*H. langwellense* F. J. Hanb. 107. Common in the Oykell Bridge district; especially abundant by the Corriemulzie River. Apparently absent from the Inchnadamph neighbourhood.—*H. globosum* Backh. 108. The Ben Hope form (*Brit. Hieracia*, p. 16), with abundant long ciliæ on the ligules and very dark styles, was found at the northern base of Canisp (about 1500 ft.); it seems to deserve a varietal name.—*H. lingulatum* Backh. 108. All the Inchnadamph plants that we saw had *pure yellow* styles; descending to 1000 ft. or less. Allt Poll-an-Droighinn; Chalda Burn; Beinn Gharbh; Canisp. — *H. Marshalli* Linton. 107.* Altt Tarsuinn, at about 400 ft.; very rare. 108. Canisp; also above Loch Maol-a-Choire (Mr. Salmon's station).—*H. hyparcticum* Almq. 108. Not quite confined to the limestone; we found one specimen by the Allt Poll-an-Droighinn, several on Beinn Gharbh (Torridon sandstone), and a fair number by a tributary of the Traligill, above the limestone limit. It is nowhere plentiful, and may be a dying-out species.—*H. rubicundum* F. J. Hanb. 108. Beinn Gharbh; Unapool Burn. By the Allt Poll-an-Droighinn occurs a peculiar form with foliage remarkably toothed.—*H. nitidum* Backh. 108. Unapool Burn.—*H. argenteum* Fr. 107.* A few specimens on rocks by the Einig River, near Oykell Bridge.—*H. callistophyllum* F. J. Hanb. 107.* Sparingly by a streamlet near Oykell Bridge, at the remarkably low level of 200 ft.; small, but quite typical. Not known before, north of Inverness-shire.—*H. silvaticum* Gouan var. *micracladium* Dahlst. 107. By the Oykell at Oykell Bridge; formerly reported as *H. duriceps* F. J. Hanb.—Var. *subtenue* W. R. Linton. 107.* Frequent by streams near Oykell Bridge; Chonaghair Burn and tributaries; Einig River; Corriemulzie River. 108. Allt Poll-an-Droighinn; Chalda Burn. Usually yellow-styled; but otherwise characteristic, and just like Mr. Salmon's specimens from Canisp.—*H. variicolor* Dahlst. 108.* A stylose form, on limestone, by the Allt-nan-Uamh, very scarce; Banff was its previous northern limit.—*H. ciliatum* Almq. 108. Allt Poll-an-Droighinn; practically identical with the Ben Hope form.—*H. serratifrons* Almq. var. *caliginosum* Dahlst. 108. Near Kylesku; dark-styled, like the Scandinavian form. A gathering from Coalbackie, near Tongue (1900), was placed here by Rev. W. R. Linton. On rocks by the Einig River (107) a hawkweed is locally plentiful (often stylose) which seems to be very near var. *morulum* Dahlst., though with more floccose and rather more hairy heads, and may perhaps come under it; we have no authenticated examples of this variety.—*H. sarcophyllum* Stenstr. 107.* Chonaghair Burn; well matching specimens from Canisp and the Moffat district.—*H. ampliatum* Ley. 107.* Chonaghair Burn; Allt Tarsuinn. 108.* Chalda Burn; Traligill; limestone above Loch Maol-a-Choire. A very interesting extension of its range, as it was only recorded

from W. Yorks; our series agrees with Rev. E. F. Linton's very closely. The plant recorded by Mr. Salmon (Journ. Bot. 1900, p. 301) as *H. cæsiomurorum* was most likely this; there is often much superficial resemblance between them, and at first sight Mr. Linton was inclined to call some of our specimens *cæsiomurorum*. — *H. euprepes* F. J. Hanb. 108.* Sparingly on Beinn Gharbh; not quite typical in the clothing of the heads and peduncles.— *H. cæsium* Fr. 107.* By the Oykell at Oykell Bridge. 108. Beinn Gharbh; Allt Poll-an-Droighinn. Mr. Linton places all these under the type.—*H. eustales* Linton. 107.* Allt Tarsuinn. 108.* Traligill. This is a satisfactory extension of an endemic species, as yet only known from a few Perthshire stations; the habit is very striking and peculiar. Some specimens agree exactly with Mr. Linton's type, while others differ in having the ligule-tips glabrous; it occurred in small quantity.—*H. vulgatum* Fr. var. *sejunctum** W. R. Linton. Abundant at Inchnadamph, where it is the prevailing form; mostly yellow-styled, particularly on the limestone, where it is often dwarfed. Also seen by the Unapool Burn, and near Kylesku. — *H. stictophyllum* Dahlst. 107. By the Einig River, near its junction with the Oykell, a form with concolorous leaves, but otherwise apparently identical, was found; the plant growing in quantity on rocks by the Oykell is typical.—*H. strictum* Fr. var. *reticulatum* (Lindeb.). 107. Oykell Bridge. 108. Unapool Burn.—*H. auratum* Fr. 107. Corriemulzie River.

Leontodon autumnale L. 108. A form with subglabrous leaves and very dark heads grows by the Allt Poll-an-Droighinn; it may be the var. *nigro-lanatum* Fr.

Taraxacum spectabile Dahlst. 107.* Frequent by streams near Oykell Bridge; already past flower at these low levels by the second week in July. Leaves more or less spotted, but less strongly so than in the var. *maculiferum* Dahlst.; our gatherings are referred to the type by Mr. Beeby. 108.* Ben More of Assynt, 1890; Traligill, 1908.

Oxycoccus quadripetala Gilib. 107.* Glen Einig.

Euphrasia curta Fr. 108. A dwarfed state of the type grows on limestone in the valley of the Allt-nan-Uamh.

Rhinanthus stenophyllus Schur. 108. Inchnadamph, plentiful; no doubt the same form as that found by Mr. Salmon.

R. Drummond-Hayi Druce. 108. Beinn Gharbh. This segregate appears to be decidedly scarcer than *R. borealis* Druce in Scotland; both were included under *R. minor* var. *Drummond-Hayi* F. B. White, and they are perhaps too nearly allied.

Pinguicula lusitanica L. 107. Roadside between Rosehall and Oykell Bridge, and in bogs about the latter place.

Ajuga pyramidalis L. 107. Chonaghair Burn and Allt Tarsuinn; scarce.

Salix caprea × (*caprea* × *viminalis*)? 108. Traligill River. Rev. E. F. Linton suggests this origin for a bush in many respects like *caprea*, but with more oblong-lanceolate leaves, more silky beneath, and differing considerably from the neighbouring *caprea*.

A *Smithiana* hybrid, most probably *caprea* × *viminalis* (*S. sericans* Tausch), grows within a few hundred yards of it.—*S. cinerea* L., form *S. oleifolia* Sm. 108. Traligill River; the prevailing, if not the only, form which occurs there.—*S. herbacea* L. 107. Chonaghair Burn, at 300 ft. or less; which is, we believe, lower than it has been found, even in Shetland. Close by was a fruiting plant of **S. herbacea* × *repens*, the second parent being plentiful.

Habenaria albida Br. 107. Inversbin. 108. On the limestone, Inchnadamph.

Scirpus pauciflorus Lightf. 107.* Common about Oykell Bridge.

Carex rupestris Bell. 108. Limestone above Loch Moal-a-Choire, at over 1000 ft.—*C. pauciflora* Lightf. 107. Descends to 200 ft. in Glen Einig.—*C. limosa* L. 107.* Moorland overlooking the Chonaghair Burn, at 600 ft. or thereabouts.—*C. fulva* Host (*Hornschuchiana* Hoppe). 107.* Frequent in bogs near Oykell Bridge; sometimes associated and hybridizing with *C. Œderi* Retz. var. *œdocarpa* And.

Phragmites communis Trin. 107.* Swamp in Glen Einig.

Bromus ramosus Huds. 108.* Near Inchnadamph; very rare.

Polystichum aculeatum Roth. 108. Unapool. We believe that it was also seen near Oykell Bridge; but no specimen was taken.

Phegopteris Dryopteris Fée. 107.* Fairly common about Oykell Bridge.

Equisetum arvense L. var. *nemorosum* Braun. 107. Damp, bushy bank of the Corriemulzie River.—*E. variegatum* Schleich. 108. Loanan River; scarce.

Isoetes echinospora Durieu. 108. Peaty pools, Unapool Burn.

FOLLOWERS OF MAN.

By the Rev. E. Adrian Woodruffe-Peacock, F.L.S.

Chelidonium majus L.

As a fairly typical instance of species which cling round the homes of men in Lincolnshire let us take *Chelidonium majus*. It would seem to be nearly as old a resident as man in Britain, for Mr. Reid (*Origin*, 107) records that "five well-preserved and characteristic seeds have been found at West Wittering, Sussex." I judge Mr. Dunn (*Alien Flora*, 8) was not quite accurate when he wrote:—"Thus it was prior to man in N.W. Europe, though not now known except in connection with human habitations." Man was certainly in Britain before "an Earlier Glacial deposit" could be "overlaid by brick-earth of Late Glacial date" (*Origin*, 94). Whether it can be now proved that man was in Sussex at that time is a question I need not go into here. Mr. Reid has also recorded this species for a Romo-British site at Caewent—Vearta Silurum of the Romans.

In Lincolnshire *Chelidonium* was first recorded by Bailey in 1836, and has since been found in all our eighteen natural history divisions. Its rock-soil range, as far as my records at present extend, is as follows:—

1. Blown Sand	10	14. Middle Lias Clay	3
2. Chalky Boulder Clay	8	15. Modern River Gravel	7
3. Cornbrash	3	16. Old River Gravel	4
4. Estuarine Alluvium	9	17. Oxford Clay	1
5. Fen Gravel	2	18. Peat	1
6. Great Oolitic Limestone	3	19. Plateau Gravel	1
7. Hilbaldstow Limestone	3	20. Purple Boulder Clay	3
8. Keuper Marl	1	21. Rhætic Shale	1
9. Kimeridge Clay	5	22. Sandy Glacial Gravel	8
10. Lincolnshire Limestone	4	23. Spilsby Sandstone	4
11. Lower Chalk	1	24. Upper Lias Clay	1
12. Lower Lias Clay	2	In all 93 records.	
13. Marlstone	8		

Its soil-range is wide, but with my present notes I am not in a position to say how wide. It loves limestones and light open soils is all that can be safely said. In every case it was confined to villages or the immediate neighbourhood of isolated dwellings. In one case at least it was *flore pleno* in form. It is practically always a hedge-plant or under-shade species, or, in other words, requires a light open untrodden soil and protection from wind. Apparently also it requires the help of other plants to rise from the soil to any height, and in this requirement of growth suggests some of the Polygonums. These peculiarities seem to imply that an open or broken canopied woodland with a certain undergrowth of bush is its native home, on lower or higher ground according to latitude.

It is one of the species that can be rightly judged to be a follower of man from its "frequency" alone. To obtain this "frequency" standard six signs are used to indicate varying states of commonness or rarity. They are the following:—v. c. equals "very common," c. equals "common," f. c. equals "fairly common," r. r. equals "rather rare," r. equals "rare," v. r. equals "very rare." To obtain the right sign for any plant at a given locality, *i. e.* state of circumstances on a soil, the species in question must never be compared as regards the proportion of its numbers with another plant of a different species; that would be simply aimless folly leading nowhere! It is quite true that any species under consideration has to be compared with something to obtain the proper standard for classification. With what, then, to get the right and only possible criterion? Here lies the difficulty, which has rendered every effort to make a method of analysis hitherto singularly abortive, and the records in floras valueless. *Every species has to be compared with the accurate knowledge the botanist has gradually acquired of the general proportion of numbers or frequency of the same species under all conditions of environment—on all soils and at all altitudes—wherever it has been observed to grow.*

Now, where as many as twenty plants of *Chelidonium* are found on a hedge-side, I should certainly add the sign v.c. Two or three plants are what most localities supply. They move a little from season to season, as most plants do when they have

exhausted the soil, but practically never increase beyond a well-defined limit. I have never seen it in masses even in herb gardens. Plants with such frequency—unless they are approaching extinction—are invariably followers of man, or of cultivation.

Chelidonium is found in Lincolnshire merely on account of its value in common domestic medicine. Though I personally have rarely known it used, my notes prove it is still a widely regarded cure for many troubles, from toothache to whooping-cough. So, though it is impermanent, it is not likely to become extinct at present.

Sonchus asper L. and *S. oleraceus* L.

Two other species can be referred to less fully, as they illustrate other portions in the ever-widening circles that surround man as their centre. They are I, *Sonchus asper* L., and II, *S. oleraceus* L. Their soil record, together, as worked out for Lincolnshire, is as follows. Notes to this table will be found in the text below it under given letters :—

1.	Blown Sand. I, 8; II, 4	12
2.	Chalky Boulder Clay. I, 19 (*a*); II, 12	31
3.	Cornbrash. I, 0; II, 2	2
4.	Estuarine Alluvium. I, 9; II, 15 (*b*)	24
5.	Fen Gravel. I, 3; II, 1	4
6.	Freshwater Alluvium. I, 6; II, 1 (*c*)	7
7.	Hessle Boulder Clay. I, 0; II, 2	2
8.	Hilbaldstow Limestone. I, 0; II, 1	1
9.	Kellaway's Rock. I, 1; II, 0	1
10.	Kimeridge Clay. I, 3; II, 0	3
11.	Kirton Limestone. I, 1; II, 1	2
12.	Lincolnshire Limestone. I, 2; II, 1	3
13.	Lower Lias Clay. I, 3 (*a*); II, 2	5
14.	Made Ground (*d*). I, 3; II, 1	4
15.	Marlstone. I, 2; II, 1	3
16.	Middle Lias Clay. I, 0; II, 1	1
17.	Modern River Gravel. I, 1; II, 2	3
18.	Old River Gravel. I, 2; II, 2	4
19.	Oxford Clay. I, 12 (*a*); II, 2	14
20.	Peat. I, 12; II, 0	12
21.	Plateau Gravel. I, 0; II, 1	1
22.	Purple Boulder Clay. I, 1; II, 0	1
23.	Sand and Gravel. I, 1; II, 0	1
24.	Sandy Glacial Gravel, I, 12 (*a*); II, 17 (*e*)	29
25.	Silt and Clay. I, 1; II, 1	2
26.	Spilsby Sandstone. I, 1; II, 2	3
27.	Upper Chalk. I, 1; II, 1	2
28.	Upper Lias Clay. I, 1; II, 0	1
	Total	178

S. asper	105
S. oleraceus	73
	178

(*a*) The form with simple leaves is much rarer generally than the pinnatifid sharply toothed form, which is a later development, I suppose.

(*b*) In one case away from the habitations by a dyke in the corner of a field, where mortar-rubbish from an old brick building had been carried to dress the soil.

(*c*) There is an original note on the rock-soil record-sheet, "most unusual." I have proof *S. asper* is water-carried; *S. oleraceus* may be too. I have met with no such evidence yet.

(*d*) Combinations made by man, which are beyond analysis now, I class thus, as railway embankments, yards, and such places.

(*e*) I have one note for the form of *S. oleraceus* which Babington calls "pinnatifid toothed." I have met with one specimen of a second form in a stackyard. It had the most extreme "pinnatifid sharply toothed" leaves of the most eccentric forms of *S. asper*. It resembled *S. oleraceus* in auricles and flowers. Its seeds were barren from bad weather, I believe. I do not believe it was a hybrid, but only an example of the same tendency that drives *S. asper* from its old individual leaves to sharply toothed pinnatifid ones, which Neo-Lamarckians can explain as they list.

S. asper L. was first recorded for Lincolnshire in 1836. It is found on roadsides and their edges, *i. e.* where the grass joins the macadam, hedge-sides and banks, wood-sides and rides, and their broken canopied, more open spots, beck-banks, or the tops of stone walls—in any place, in fact, which joins tilth or broken ground, its natural home. The seeds are wind-sown and water-carried. In stunted late flowering winter plants the phyllaries are much rougher, with spinous hairs, than in the normally flowering ones. This makes the species cling to the clothes of men and fur of animals. It is carried sometimes in this way from spot to spot. This species is clearly a follower of man and of agriculture.

S. oleraceus L. was first recorded for Lincolnshire by H. C. Watson in 1851. It is found in garden ground and in village hedges, wall-roots, on the top of stone walls, more rarely between the bricks, or on the top of brick walls. It is found in quarries when near villages, and round flour-mills. It is a follower of man, but only in the immediate neighbourhood of his dwelling or working places. It is not a follower of cultivation with us yet in Lincolnshire. Its type leaf form has not varied yet to the same extent as *S. asper*, or, in other words, it is not so adaptable. It takes the inner circle round man's home, while *S. asper* fills the wider circle surrounding his agricultural and other doings. Every exception I have met with is stated in the notes on the table above.

We have three species—and their frequency proves it too—surrounding man named in this paper: *Chelidonium* in the circle round the garden, but not wholly in the village; *S. oleraceus* in the garden, and in the wider circle drawn just outside the village, but

close home; *S. asper* in the wider circle still, wherever man is truly found in residence and at work.

If a second life could be given for making full notes it would be possible to arrange all the British Flora round man in ever-widening circles, from *Poa annua* L. of the quieter old stone-paved streets of London to the rarer species of our mountain tops. Some species cling to man, some shun him; but all would fall into a definite position when fully arranged by rock-soil evidence.

Anagallis arvensis L.

A note on *Anagallis arvensis* may be added here, with special reference to Mr. Marshall's remarks on p. 110. Can either Mr. S. T. Dunn's *Alien Flora* or any of "our recent county floras" be compared in method with Watson's work? If I have not shown that the fundamental idea lying behind Mr. Dunn's method is fallacious, my paper in this Journal for 1908, pp. 340–346, has failed in its object. Why then quarrel with Watson's definition of "casual colonist" as applied to *A. arvensis*? I fancy the writers of the two best floras I know would be the first to allow that they have no sufficient body of exact notes for special generalizations on nativeness or alienness. Naturally *A. arvensis* is an open soil desert-prairie species. In Britain it can only find the conditions it requires in cultivated crops or on marine sands. In the latter situation it may rarely be found in the most sunny parts of England consorting with true maritime species. Can any such consorting species be true natives? I do not ask this carelessly; I want exact facts. *A. arvensis* has never yet been recorded for the shore line of Lincolnshire, except by docks, &c., with other extra-areal species. I have found it myself on the sand coast-line of North and South Devon, but only where it could be introduced from cultivation close by. Mr. Bernard Reynolds was resident at Skegness through last spring and summer, and, being a lover of plants, made full notes of all he discovered; he also made another list of what he expected to find and did not meet with. He kindly sent his note-book to me, and I copied it on the rock-soil method and added it to my other notes.

In Mr. Reynolds's list of common species not seen is *A. arvensis*. We know the moisture of Cornwall and Devon is far greater than the approximately continental rainfall of Lincolnshire, though their sunlight range is about the same as Skegness. If these two matters, taken in conjunction with what I wrote on p. 29, do not tend to settle the position of *A. arvensis* in the south-west, nothing else, I believe, will. With full notes on locality and frequency, such as I possess, by no unprejudiced person could its place be disputed. Its frequency alone where it is found proves it to be an extra-areal follower of man or escape from cultivation. Looked at from this point of view it is in just the same position in the south-west and north-east of England.

SHORT NOTES.

A "Double" Orchis.—A curious specimen of *Orchis Morio* L. was brought me in May by one of my flower-class, which seems to be a step in the direction of a double *Orchis*. The sepals were normal, and so were the lip and nectary, except in one flower in which the nectary was doubled up and inverted, rising into a short blunt cone on the base of the lip. Between the erect sepals and the pendant-spreading lip each flower contained a perfect flower and a monstrous one. The former occupied the left side, and, while the anthers were nearly normal, the petals and lips were much undersized, and the nectary small and shortened. The monstrous flower was larger, curiously contorted and turned on its side; the upper petals short and crumpled being to the extreme right of the whole flower, two narrow lips standing out patent from the centre of the flower, one superimposed on the other, contiguous in their lower part; while a solitary anther lay hid in what appeared to be enlarged processes of the membranous covering of the other anther and of the rostellum. Instead of the usual ovary was a long slender pedicel, purplish in colour, half as long again as the bract or more, with no trace of the spiral twist and thickening that an ovary would show.—E. F. Linton.

Smyrnium Olusatrum L.—Coming up from Dover on May 17 I was struck with the very great abundance of this plant for some distance by the railway and up the cuttings and grassy slopes on the right hand of the railway immediately after leaving the town. It is presumably a comparatively recent introduction, as it is not recorded for district 7 in the *Flora of Kent*.—James Britten.

Solanum tuberosum L. and its Allies.—Molina, in his *History of Chile* (1782), makes the following statement with reference to the Araucanian Indians, *viz.*: "They are particularly fond of maize or Indian corn, and potatoes; of the last they have cultivated more than thirty different kinds from time immemorial, esteeming them a very healthy nutriment" (Eng. Trans. ii. 121, 1809). Perhaps most of the "wild" tuber-bearing Solanums of South America are the descendants of cultivated potatoes, improved by the Indians centuries ago, then reverting to wildness as the aborigines died out or were driven back, and hybridizing naturally for ages since. No one now expects to find the original wild maize; may it not be equally futile to seek for the original wild potato?—R. Morton Middleton.

Watson Botanical Exchange Club.—With regard to the suggestion of the Editor in this Journal for May (p. 185) that the duplication of publication of notes in the Reports of the Watson Botanical Exchange Club and the Botanical Exchange Club of the British Isles "is surely neither necessary nor desirable," I am afraid it is impossible for the Watson Club—whose Report is usually issued last, owing to the later date at which the distribution takes place—to avoid such duplication, since, by doing so, the thirty-seven members who do not belong to the Botanical

Exchange Club, and presumably do not receive the Reports of that Club, would be deprived of some very interesting notes.—G. Goode, Hon. Sec. W. B. E. C.

REVIEWS.

Prodromus Floræ Britannicæ. By Frederic N. Williams. Part 5. Pp. 207–258. Brentford: C. Stutter. March, 1909. Price 2*s.* 8*d.*, post free.

After an interval of more than five years, the author continues his account of the species native or established within the limits of the British Isles. In this instalment fifty-nine species under twenty-eight genera, belonging to nine families, occupy fifty-two pages; the seven families, *Adoxaceæ*, *Caprifoliaceæ*, *Rubiaceæ*, *Apocynaceæ*, *Gentianaceæ*, *Oleaceæ*, and *Solanaceæ* are included in their entirety, and the greater part of *Asperifoliaceæ*; one species of the genus *Valerianella*, left over from Part 4, finishes *Valerianaceæ*. British botanists will feel an interest in noting, but probably without much surprise, that the little Moschatel is considered to constitute an independent family. Such an opinion was expressed on the Continent more than seventy years ago, and has been in recent years adopted by many German and other botanists. The floral structure comes nearest to the caprifoliaceous type, but, as explained by Eichler, "The absence of a true calyx, the false duplication of the andrœcium, and the character of the inflorescence, are of heterotypic significance."

The only other important systematic change made in the treatment of the plants dealt with consists in transferring the Field Madder to the genus *Asperula*, and the consequential disappearance of the genus *Sherardia* from the names of British plants. In this matter Mr. Williams has followed the opinion of the German botanist Höck, as published in 1893. The name of the learned and munificent botanist, William Sherard, of Oxford, on whom the title of prince and Mæcenas of botany has been bestowed, will, however, still remain associated with the plant; for Höck called it *Asperula Sherardi*, and this name is adopted by Mr. Williams.

Of nomenclature the author states that he "prefers to say little, as it bears but little on the scientific study of plants"; nevertheless the greater portion of the note prefixed to this part is taken up with observations on the subject; moreover, a few unaccustomed names appear. Thus, *Vinca minor* L. becomes *Pervinca minor* Scop. By way of justification for this restoration he adds the note:—"In his account of the Italian *Apocynaceæ*, Caruel has rightly followed the best authorities in keeping up Tournefort's genus *Pervinca*, which is almost similar in form to the English name of 'periwinkle.' As Caruel says, Haller, Adanson, Scopoli, Allioni, Mönch, and Dumortier, all of whom had sounder and more scientific views of genera than had Linnæus,

retained the name long established by which the genus had always been known by botanists, and uniformly agreed in ignoring the arbitrary and irrational change of name proposed by Linnæus in defiance of the canons which he himself laid down for the use of botanists, but which he by no means consistently followed." With corresponding explanations, in *Solanaceæ*, the name *Atropa Belladonna* L. is replaced by *Belladonna trichotoma* Scop., and that of *Datura Stramonium* L. by *Stramonium fœtidum* Scop. On the whole it must be recognized that our author takes exemplary advantage of, and gives full effect to, the leading principle laid down in the first paragraph in the third article of the International Rules for Botanical Nomenclature, which provides that "the rules of nomenclature should neither be arbitrary nor imposed by authority."

The plan of Mr. Williams's work is happily based to some extent, as he mentioned in the introduction to his first part, on the lines of Willkomm and Lange's *Prodromus Floræ Hispanicæ*, and it reaches a high level of scientific accuracy, serving a model for a flora of a fairly well explored country. Successful attempts have also been made at more than usual precision in minor characters, which are often overlooked in descriptions.

One such minor point, not however mentioned by him, may be added. This relates to the inequality in the stipules of the Dwarf Elder, and is not noted in most descriptions, though Caruel, *Flora Italiana*, vii. pp. 107–108 (March, 1887), states, "Le stipolo sono . . . un po' disuguali." A botanical friend of mine, Mr. A. Sharland, first drew my attention to this detail. In some specimens the stipules are observed to be very unequal in size, one being much larger than the other at the base of the same petiole, so that those on one side of the stem are nearly equal, and those on the opposite side of the stem are very different in size from the former, though among themselves they are nearly equal.

According to the tenth recommendation of the Vienna International Code, specific names which are old generic names should begin with capital letters. This recommendation is disregarded in the eleven instances which occur in this part, namely, *Adoxa moschatellina*, *Lonicera periclymenum*, *Viburnum lantana*, *V. opulus*, *Sambucus ebulus*, *Galium mollugo*, *G. aparine*, *Erythræa centaurium*, *Gentiana pneumonanthe*, *G. amarella*, and *Solanum dulcamara*.

In the section *Endotrichia* of *Gentiana* three species are enumerated, namely, *G. Amarella*, *G. germanica*, and *G. campestris*, with full and accurate descriptions. The second species, which in many books is treated as a variety of the first, is stated to be perhaps not more than a subspecies, and to be associated and to form hybrids with it. The third species, which is also an annual and is differentiated from the others by tetramerous flowers, has for a synonym *G. baltica* Murb.; the variety *obtusifolia* F. N. Will. is the *G. Amarella* var. *præcox* of some English authors. This variety is found in the South of England, and after

comparing specimens of one plant with a long series from Central Europe, Mr. Williams concludes that they should be referred to *G. campestris* rather than to *G. Amarella*, notwithstanding some difference in habit.

W. P. H.

Untersuchungen über Reizerscheinungen bei den Pflanzen. Mit Berücksichtigung der Einwirkung von Gases und der geotropischen Reizerscheinungen. Von WARWARA POLOWZOW. Pp. 229. Mit 11 Abbildungen u. 12 Kurven in Text. Jena: Gustav Fischer. 1909. 6 marks.

NOTWITHSTANDING the fact that during recent years many investigations into the phenomena of irritability have been undertaken, our knowledge of this branch of plant-physiology remains vague. This is the case not only with respect to the mechanism of plant-response, but also with respect to the simpler factors of irritability which admit of precise measurement. For example, the *presentation time* for geotropic response, *i.e.* the minimal time of exposure to the stimulus necessary to induce a reaction is, according to Czapek, in the hypocotyl of *Helianthus annuus*, twenty minutes; according to Fitting, five to six minutes; and, according to Bach, three minutes. Further investigations as to the actual course of events in the reaction of plants to stimuli, and particularly of the time-relations which subsist between perception, transmission, and reaction, are therefore to be welcomed. These Polowzow provides in the work before us, which gives an account of his researches on the responses of plants to the stimuli of gases—a type of irritability selected for these investigations because it has received but little attention—and of the response to gravity, selected for the converse reason.

The question of directive response of plants to gases has been investigated by Molisch, Sammet, and others, but the results obtained have not been uniform. By more exact methods and by the use of the horizontal microscope, Polowzow has proved that not only are roots capable of responding æroidotropistically to certain gases, but that shoots exhibit a similar reaction.

The plants experimented with consisted for the most part of seedlings of *Helianthus annuus* grown in pots. The plants were placed under a bell-jar standing over a dish of water. The gas, the effects of which were to be investigated, was led into the bell-jar through glass-tubes. A porous tube, connected with the gas supply-tubes and standing in a definite position with respect to the plant, allowed of the diffusion of the gas, which thus reached the plant from a definite direction. Accumulation of the gas in the bell-jar was prevented by absorption or by sweeping out the gas under the bell-jar by a siphon arrangement. The results of the experiments show that both carbon dioxide and oxygen set up tropisms, whereas hydrogen and nitrogen are inert. The positive results obtained by earlier investigators with nitrogen are shown to have been due to the presence of traces of ammonia.

According as the diffusing CO_2 is small or large in amount, so

the tropistic reaction varies. When the amount is small, the first effect is a + curvature followed by a — curvature; when the amount of CO_2 is larger, a — reaction only occurs.

It is noteworthy that the rate of reaction is very quick; after five minutes' exposure to the diffusing stream of CO_2, curvature can be recognized by the aid of the horizontal microscope.

Other experiments lead the author to conclude that transmission of the results of stimulation occurs, *i. e.* that the perception- and reacting-regions are not coterminous.

Polowzow then passes on to the examination of geotropic response, and shows that the reaction time is much shorter than is generally supposed. He points out that it is not proper to rely on curvatures recognizable by the unaided eye, and that the horizontal microscope enables an observer not only to determine the onset of the reaction, but to follow its course. With seedlings of the *Gramineæ* (secale, &c.) exposed for one minute in a horizontal position to the stimulus of gravity, geotropic curvature may be recognized, by the use of the horizontal microscope, to commence within so short a time as thirty seconds or less after the plant has been replaced in the vertical position. The importance of these observations lies in the bearing that the rate of reaction has on the theories of the mode of transmission of nervous impulses or their equivalents in plants. If they are confirmed, it will no longer be possible to urge the slowness of plant-reactions in support of the view that the conducting mechanism of plants differs from that of animals.

The methodological part of the work under review consists in a critical consideration of the current points of view with respect to the physiology of irritability. Scientific men are so apt to be impatient of the criticism of philosophers that it is at all events to be desired that they should from time to time endeavour to review their own subject from a philosophical standpoint. This Polowzow does in most interesting fashion.

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FREDERICK KEEBLE.

Handbuch der Systematischen Botanik. Von Dr. RICHARD R. v. WETTSTEIN. Band ii., Teil 2 (zweite Hälfte). Royal 8vo. Pp. 395–578, with 104 illustrations, including 700 figures. Leipzig & Vienna: Deuticke. Price 8 marks.

THE present instalment forms the concluding section of Prof. Wettstein's excellent Handbook; a contribution to Systematic Botany clearly set out, and remarkable for the extent and number of its illustrations and figures in the text. This final instalment includes the Sympetalous Families of Dicotyledons and the Monocotyledons. The series are, however, not everywhere sharply marked off. Even as there are some choripetalous groups (or at least groups with choripetalous characters) among the Sympetalæ, so inversely does the opposite condition sometimes obtain. In the same way, in the earlier part of the work the *Caryophyllaceæ* are placed among the Monochlamydeæ. The Sympetalous Families are arranged in ten series (or orders). Compared with Engler's system

as it appears in the fifth edition of his *Syllabus*, the following differences may be noted. The family of *Plumbaginaceæ* constitutes a single series (Plumbaginales). The families of *Convolvulaceæ* and *Cuscutaceæ* constitute the series Convolvulales. The *Menyanthaceæ* are kept as a distinct family from *Gentianaceæ*, instead of forming two subfamilies. The series Ligustrales includes *Oleaceæ* and *Salvadoraceæ*. The series of Plantaginales is dropped, and the *Plantaginaceæ* placed among the Tubifloræ. The family of *Adoxaceæ* is dropped also, and the genus *Adoxa* placed (in the earlier part of the present volume) among the *Saxifragaceæ*, in which family it was included long ago before it was transferred to *Caprifoliaceæ*. M. Louis Morot has pointed out that the earlier systematists were possibly right in their views of the affinities of the anomalous plant which alone represents this genus.

Very obvious are the differences between the system of Engler and that of Wettstein among the Monocotyledons. In the first place, they come at the end of the system; that is, the Dicotyledons are placed between the Gymnosperms and the Monocotyledons, as in Pfitzer's Outline Sketch. Among other fundamental differences may be mentioned the following. The first series are the Helobiæ—not the Pandanales, as in Engler's system, which by Wettstein are sunk in the Spadicifloræ. Then follow the Liliifloræ, in which, however, the families of *Burmanniaceæ* and *Bromeliaceæ* are included. Then come the Enantioblastæ (by Engler called Farinosæ); then the Glumifloræ and Scitamineæ. After this follow the Gynandræ, comprising only the family of *Orchidaceæ*, which family with *Burmanniaceæ* constitutes Engler's series of Microspermæ. Up to this point there certainly seems some phylogenetic basis for the sequence of the six series. The seventh (and last) series of the Spadicifloræ seems, however, to be somewhat of a miscellaneous association of families, beginning with *Palmaceæ* and ending with *Lemnaceæ*.

The bibliography of each group, in the form of clearly printed footnotes, is excellent; and the memoirs of foreign botanists are freely quoted. This hospitality extends even to English nurserymen, who would not themselves claim to be scientific botanists. Dr. Rendle's memoir on *Naiadaceæ* is quoted; also his paper in this Journal (1901, p. 39) on the bulbiform seeds of *Amaryllidaceæ*. Dr. Stapf's studies in Grasses are, perhaps, too recent to be fully taken account of. Many of the illustrations are full-page, and include landscapes and human constructions, such as the grove of palms near the Great Pyramid (p. 536), and the group of bamboos in the Botanic Garden of Peradeniya (Ceylon). As a recent digest (with a good deal of original work included) of the special morphology of the natural groups of plants within a reasonable compass, Prof. von Wettstein's admirable Handbook will commend itself to all serious students of Systematic Botany.

FREDERIC N. WILLIAMS.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on May 6th, Mr. E. A. Newell Arber explained by lantern-slides the œcology of two alpine species of *Sempervivum*, namely, *S. arachnoideum* and *S. montanum*; he pointed out the formation of primitive soil by three methods: (1) from crustaceous lichens, (2) mosses, and (3) decay of coniferous needles. Upon this primitive soil these *Semperviva* flourished and formed groups, which might be regarded as individuals or colonies, but for which he preferred the non-committal term of "pseudo-colony." The stolons, which were emitted from the rosettes, were sometimes of great length before giving rise to a daughter-rosette.

We note with much satisfaction that British botany is receiving its full share of attention in contemporary magazines. The *New Phytologist* for March contains an exceedingly interesting paper by Dr. F. E. Weiss on the dispersal of the seeds of Gorse and Broom by ants, and a paper by Mr. W. Watson on the distribution of bryophytes in the woodlands of Somerset, which should be read in connection with the list by Mr. Ingham and himself published in our May number. The April issue of the *New Phytologist* includes a description and figures of *Pyramimonas delicatulus*, a new *Volvocacea* from Shanklin Pool, Kidderminster, by Mr. B. M. Griffiths, and a paper by Mr. A. W. Bartlett on an abnormal gynæceum in *Stachys sylvatica*. The *Annals of Botany* for April contains, among other important papers, two which will interest British botanists—one by Mr. Massee on the Structure and Affinities of British *Tuberacei*, with an excellent plate, the other an elaborate account of "Stratification in the Vegetation of a Marsh [Wicken Fen, Cambridgeshire] and its relations to evaporation and temperature," by R. H. Yapp.

Messrs. Swan Sonnenschein & Co. send us two odd little eight-page pamphlets, price 6d. each, by Francis Ram—one in prose, the other in verse. The former, which we do not pretend to understand, is called *Ether Islands—a Supposal*: the latter, *Needy Science*, is a plea for the endowment of research. It begins

> "Bright diamonds and sparkling stones, white silver, yellow gold,
> And many other clinkant things the teeming earth doth hold;"

and proceeds to show that knowledge is more valuable than these. "Vulgar Ostentation" is the god that rules the millionaires:

> "Remarkable it is her beneficiaries oft
> Are very common people till she raises them aloft."

Having described a millionaire and millionairess, the author concludes:—

> "Well, I shall straight to Fortune go, and have it out with her:
> I'll know why such ignoble men she seemeth to prefer.
> And phrases very forcible I'll use to let her know
> That she on men who aid Research her bounty should bestow."

The newspapers have noted among the surroundings of the body of the late George Meredith "sprigs" or "branches" of

"white bean," one of his favourite plants. There can be little doubt that White Beam (*Pyrus Aria*) is intended, which is a conspicuous ornament of the chalk range about Box Hill.

A VERY handsome quarto volume—the first—of *Illustrations of Conifers*, by Mr. H. Clinton-Baker, has been "privately printed" at Hertford. It is based on the Pinetum at Bayfordbury, Hertford, which was established by the author's grandfather in 1839, with the assistance of John Claudius Loudon. Since the founder's death in 1896, Mr. H. Clinton-Baker has continued to develop the work, and the specimens here reproduced from photographs are almost wholly taken from the collection; each plate is accompanied by descriptive letterpress. The typography, save for the title-page which is ugly, is very creditable to the local printers.

FREDERICK EDWARD HULME, who died at Kew on April 10, was born at Hanley, Staffordshire, in 1841, and was buried at Brookwood on April 14. He studied art at South Kensington, and was subsequently Art Master at Marlborough College and Professor of Geometrical Drawing at King's College, London. He wrote and illustrated popular books on various subjects, the best-known (and perhaps the best) of which is *Familiar Wild Flowers*, which was begun in 1875 in monthly parts and has more than once been reissued; his illustrations to this are pretty and accurate, and the book has deservedly attained popularity. Of the companion series, *Familiar Garden Flowers*, the plates only were supplied by Hulme. He became a Fellow of the Linnean Society in 1869.

MR. DRUCE sends us some notes which bear upon our remarks (p. 195) upon the recent volume on the Ashmolean Natural History of Oxfordshire. *Rhinanthus anglicus* was a name proposed (in litt.) by Dr. von Sterneck for a plant sent him by Mr. Druce, but subsequent investigation did not warrant specific separation. The *Cotoneaster* was found on a small island adjacent to Anglesey; Mr. Druce, with characteristic energy, visited the place and found that the plant was *C. microphylla*, which seemed completely naturalized. The sentence relating to *Carex rhynchophysa* is, as was apparent, a jumble; the specimens exhibited were of the Irish plant at first erroneously recorded as that species (see Journ. Bot. 1893, 33; 1899, 368).

WITH commendable promptitude the Librairie Hermann (Paris) has issued the second volume of Dr. C. Houard's important work, *Les Zoocécidies des Plantes d'Europe et du Bassin de la Mediterranée*. We gave some account of the scope of the work when noticing the first volume (see Journ. Bot. 1908, 367); the second volume contains a bibliographical index and a full index of the species of plants and insects mentioned in the text, as well as an introduction to the work. The two volumes, which occupy nearly 1300 pages, cost 45 francs.

IN the *Essex Naturalist* (xv. Jan.–July, 1908, pp. 152-163), Mr. John French gives an interesting account of plant distribution in the neighbourhood of Felstead. After touching upon the conditions attending the struggle for existence, he points out that the

channels of communication by which invasive plants have reached Felstead in old times were the rivers, the woods, the roads, the commons, and probably a certain amount of artificial agency. At the present time the rivers are changed in their character, and are not perpetually in flood; the woods are reduced to conservatories; the commons have disappeared; artificial agency has much increased. The author divides the local flora into four groups, as follows:—I. Plants not often widely distributed but new, or comparatively new, arrivals (sixty-four species). II. Plants well established and more widely distributed, but not yet at their culminating stage (thirty-four species). III. Plants plentifully distributed, generally of an invasive character, and at or near their culminating stage (eighty-seven species). IV. Plants which linger on and are clearly on their way to local extinction (eighty-three species).

Under the startling heading (in large capitals) "Weed-eating Plant: a Wonderful Tropical Creeper" the *Westminster Gazette* recently gave an account of "a plant botanically known as *Commelina nudiflora linnea*" (sic), in which "it appears that at last an antidote has been found to the noxious weeds which are so frequently the death of certain forms of plant and vegetable life in the East." The narrative continues: "The prolific weed known as 'lalang' is the great enemy to rubber growth. It was the accident of observing that where the blue-flowered creeper came in contact with the lalang the latter became much less injurious that induced a planter to send specimens to Kew. It seems that first one begins to notice that the weeds are becoming less prolific where the creeper is growing among them. This improvement steadily increases as time goes on, and it has been found that, under the influence of this antidote, lalang which was formerly four or five feet in height has been reduced to one to two feet only when it starts to flower. But, the joyful discovery having been made that here was an undoubted set-back to the weedy growth that chokes young rubber and is the bane of the planter's life, the question arose: Would the antidote itself exercise a prejudicial effect on the rubber? Therefore the specimens were duly submitted to Kew; and, as was stated to our representative, the new creeper is 'unlikely to have any harmful effect on young rubber-trees.' Planters all over the East may therefore take heart of grace, and also take this new 'medicine.'" They may, but it seems extremely unlikely that they will; for in the Kew *Bulletin* for March Mr. Ridley points out that the *Commelina* "cannot grow with Lalang and not at all on the clay ground where Lalang is most troublesome," and another authority tells us that, in addition to this, the habit and growth render it entirely unfit for such purposes, as "it is not by any means a robust growing creeper, never rising more than six or eight inches from the ground and does not even possess the property of climbing other vegetation." So it is Lalang—*Andropogon caricosus* L.—rather than the planter, which may take "heart of grace."

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THE

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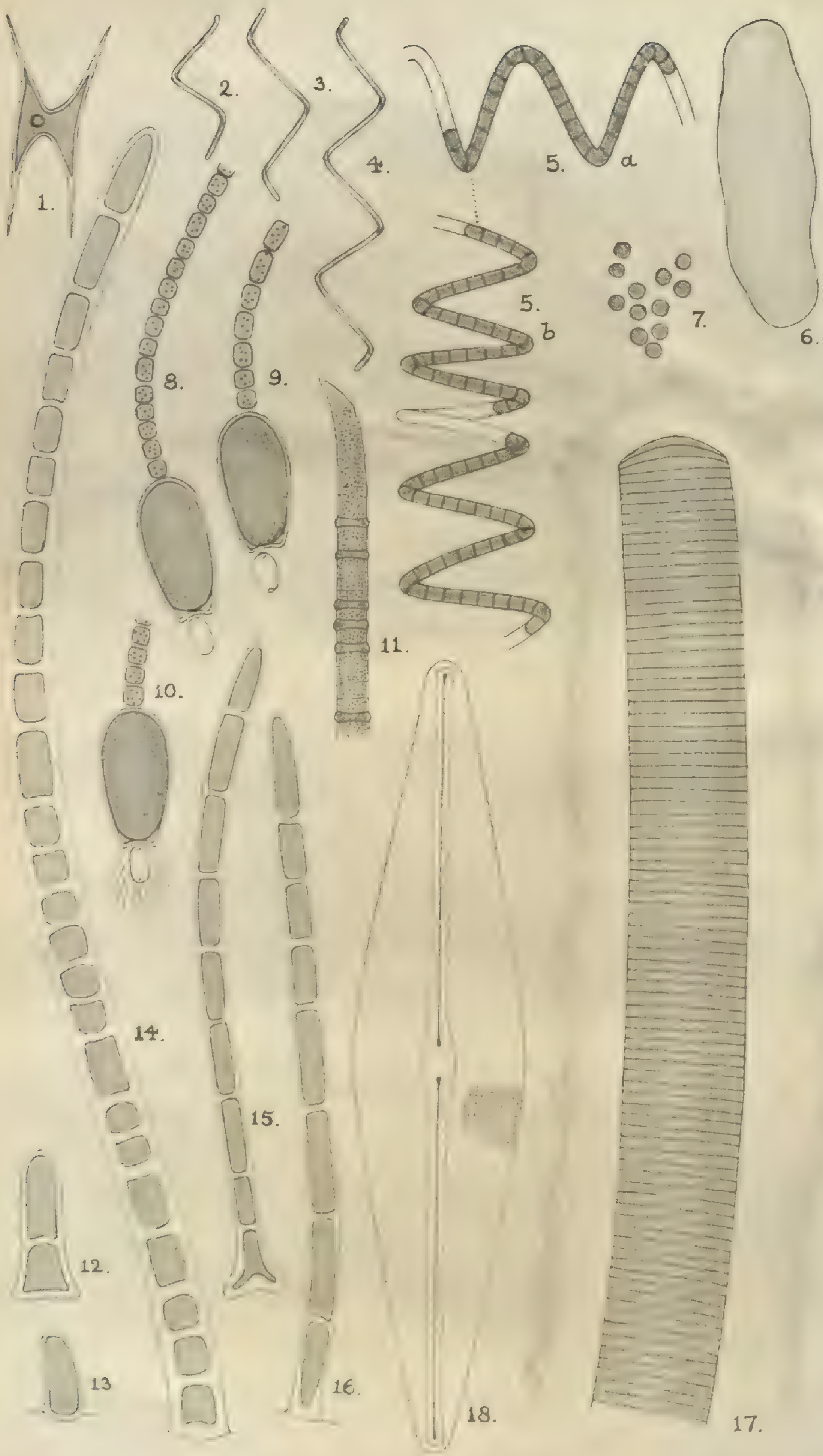

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AFRICAN ALGÆ.

THE ALGÆ OF THE BIRKET QARUN, EGYPT.

By G. S. West, M.A., D.Sc., F.L.S.

(Plate 498.)

The Algæ comprised in the present paper were collected by Dr. W. A. Cunnington during the recent expedition (1907) conducted by himself and Mr. C. L. Boulenger to the Birket Qarun, a lake in the Fayûm Province of Egypt. Little is known of the Algæ of Egypt, and the only records I can find are a few by Hansgirg and Zahlbruckner.*

The Birket Qarun is a shallow lake some twenty-five miles in length by five or six miles in breadth. Dr. Cunnington states † that "it is, however, only a remnant of the historic Lake Moeris, which was many times greater." The lake still communicates with the Nile by the Bahr Yusef, a channel over two hundred miles long. The water is brackish, with a density a little above that of fresh water (specific gravity = 1008·2 at 60° F.). The total amount of dissolved salts is about 1·1 per cent. Dr. Cunnington writes that, "since the lake is so shallow, the water is subject to considerable changes in temperature, corresponding to the differences of the air-temperature between night and day, which are often pronounced. Recorded temperatures show a maximum of 94·2° F. in very shallow water close to the shore about 2 p.m., and a minimum of 54·8° F. as a surface reading in the early morning. A difference of temperature of as much as 8·8° F. was also observed between the surface water and that at a depth of six feet."

Algæ were collected from the shores of the lake (principally from stones), from ponds, swamps, and stagnant pools near the shores, and from the inlets. A number of plankton-collections were also made. The total number of Algæ obtained, *viz.* sixty-six species, is not very great, a fact which must be attributed to the brackish character of the water from which most of the collections were made. As one would expect, the *Chlorophyceæ* are poorly represented (only fourteen species or 21·2 per cent.), whereas the *Myxophyceæ* and *Bacillarieæ* are very prominent, the former being represented by nineteen species (or 28·8 per cent. of the total) and the latter by thirty-two species ‡ (or 48·5 per cent.).

One of the most interesting features of the collections was the occurrence of *Polysiphonia utricularis* Zan. and a form of *Enteromorpha plumosa* Kütz., both of which are typically marine Algæ. The presence of a species of *Polysiphonia* in the lake is quite on a level with the occurrence of the Anthomedusan discovered by

---

* *Vide* Ann. k. k. Naturhist. Hofmus. Wien, 1904, pp. 402, 403, &c.

† Cunnington in Proc. Zool. Soc. June, 1908, p. 3.

‡ It is probable that at least ten more species should be added to the Diatoms, as there are some which I have not been able to satisfactorily identify.

the expedition. The majority of the Algæ collected were brackish forms, the only freshwater species being obtained from near the mouth of the Wady.

The littoral Alga-flora.—Included in this section are all those Algæ attached to stones on the shores of the lake, those floating in shallow water near the shore or thrown up on the beach by the waves, and also those scraped from the bottom of the boat used by the expedition.

The common Alga attached to the stones of the shore was a form of *Entermorpha plumosa* Kütz., which showed considerable variability in its characters. Amongst it were numerous Diatoms, especially *Nitzschia plana* W. Sm., a variety of *N. Sigma* W. Sm., and *Navicula avenacea* Bréb., the latter frequently forming a thick, yellow-brown stratum. *Gyrosigma elongatum* (W. Sm.) G. S. West was also conspicuously present, and numerous threads of *Spirulina subtilissima* Kütz. occurred in the diatomaceous stratum which covered some of the stones.

Attached to the bottom of the boat were quantities of *Cladophora fracta* (Dillw.) Hass. more or less loaded with the epiphytic *Rhoicosphenia curvata* (Kütz.) Grun. and *Navicula avenacea* Bréb. Among the dense clusters of branches were quantities of *Melosira Borreri* Grev. and *Bacillaria paradoxa* Gmel. A soft, dull green stratum of *Phormidium ambiguum* Gom. covered those parts not occupied by the *Cladophora*, and many Diatoms found a home in this stratum.

Close to the shore, in the inlets, *Ulothrix flacca* (Dillw.) Thur. was not uncommon, and *Polysiphonia utricularis* Zan. was found floating in shallow water, mixed with filaments of *Enteromorpha plumosa* Kütz. Epiphytic on the *Polysiphonia* were large numbers of *Cocconeis Placentula* Ehrenb. and *Asterocystis smaragdina* (Reinsch) Forti.

Thrown up on the beach were numerous pieces of the felty stratum of *Spirulina subtilissima* Kütz., doubtless torn from the stones by the wave-action.

The stagnant pools around the lake were also brackish in character, and from them and a drying-up salt-lagoon a number of the *Oscillatoriaceæ* were collected. Chief among these were *Phormidium Corium* Gom., *Oscillatoria proboscidea* Gom., *O. brevis* Kütz. var. *neapolitana* (Kütz.) Gom., and a form of *Spirulina laxissima* G. S. West. Spore-bearing filaments of *Nodularia spumigena* Mertens also occurred among the *Oscillatoriaceæ*, and one pool contained a large quantity of a species of *Euglena*.

The Plankton (in April, 1907) consisted for the most part of immense numbers of Entomostraca and Rotifers. Among this teeming animal life was a somewhat meagre phytoplankton comprising only three species of Diatoms. These were *Campylodiscus Clypeus* Ehrenb., *Melosira Borreri* Grev., and *Nitzschia Palea* (Kütz.) Grun. The two former were fairly abundant, but the last-named was very rare.

Swampy Ponds at the Mouth of Wady (fresh water). Some swampy ponds near the mouth of the Wady were much less

brackish than most of the others, and these ponds yielded some very interesting *Chlorophyceæ*. Two species of *Spirogyra* were obtained with zygospores, *S. decimina* (Müll.) Kütz. (the most frequent species of the genus in tropical and subtropical countries) and *S. dubia* Kütz., and among them were fine fruiting specimens of *Zygnema chalybeosporum* Hansg. with characteristic dark blue spores. A thin monogynous form of *Vaucheria sessilis* (Vauch.) DC. also occurred in quantity, and with it a few fruiting filaments of *Œdogonium intermedium* Wittr.

Among these *Chlorophyceæ* were a number of interesting blue-green Algæ, the most conspicuous of which were two species of *Cylindrospermum* (of which one—*Cyl. indentatum*—is new), *Anabæna oscillarioides* var. *tenuis* Lemm., *Katagnymene palustris* sp. n., and several species of *Phormidium* and *Oscillatoria*.

Systematic Account of the Species.

In the following list the Diatoms are to some extent incomplete. This is particularly the case with the genus *Nitzschia*, species of which always occur abundantly in brackish water. I have met with the greatest difficulty in attempting to identify some of these Egyptian species of *Nitzschia*, especially the smaller sigmoid forms, and some of them have consequently been omitted from the present list. Of the *Myxophyceæ*, the most interesting are *Cylindrospermum indentatum*, *Katagnymene palustris*, and *Asterocystis smaragdina*. The numbers after the localities are those attached to Dr. Cunnington's collections.

Rhodophyceæ.

1. *Polysiphonia utricularis* Zan. Floating in shallow water, Island Camp (no. 451).

Chlorophyceæ.

2. *Œdogonium intermedium* Wittr. in Wittr. & Nordst. Alg. Exsic. 1886, no. 178; Hirn in Acta Soc. Sci. Fennicæ, xxvii. 1900, p. 94, t. 5. f. 31.

Forma oosporis oogonia non complentibus.

Crass. fil.		17–19 μ;	altit.	3–3½-plo major.
,,	oogon.	41–46 μ;	,,	42–46 μ.
,,	oospor.	35–38 μ;	,,	35–37 μ.
,,	cell. antherid.	18 μ;	,,	6 μ.

Swampy ponds near mouth of Wady (no. 389).

3. *Ulothrix flacca* (Dillw.) Thur.; Hazen in Mem. Torr. Bot. Club, xi. 1902, p. 155, t. 20, f. 7–9. Crass. fil. 20–29 μ. Inlet of lake, close to shore at Promontory Camp (no. 440).

4. *U. tenerrima* Kütz. Crass. fil. 8–9 μ. Coating the stems of grasses in about one foot of water in swamp near east end of Birket Qarun.

5. *Enteromorpha plumosa* Kütz. Crass. fil. 52-107 μ; cell. 8–14 μ. On rocks in shallow water (no. 454). Also other forms, on stones and floating (nos. 426 and 451).

6. *Cladophora fracta* (Dillw.) Hass. Crass. fil. prim. 98–107 μ, ram. 34–45 μ. Attached to the bottom of the boat (no. 421); also obtained floating in the river "El Wady" (no. 397).

7. *Vaucheria sessilis* (Vauch.) DC. A rather slender monogynous form. Crass. fil. 44–48 μ; long. oogon. 92–98 μ, lat. 70–75 μ. Swampy ponds near mouth of Wady (no. 389).

8. *Zygnema chalybeospermum* Hansg. in Hedwigia, 1888, p. 257; in Notarisia, 1889, p. 679. Crass. cell. veget. 28–31 μ; diam. zygosp. 42–47 μ. Swampy ponds near mouth of Wady (nos. 389 and 393). This interesting species of *Zygnema* occurred in abundant conjugation, and the ripe zygospores were of a dark blue colour. The Egyptian plants were very slightly larger than those originally described by Hansgirg from Bohemia, but were otherwise exactly similar.

9. *Spirogyra decimina* (Müll.) Kütz. With the preceding species (no. 389).

10. *S. dubia* Kütz. Tab. Phyc. v. t. 24, f. iv; Rabenh. Flor. Europ. Algar. iii. 1868, p. 243. Crass. cell. veget. 48 μ; long. zygosp. 66–82 μ. Scarce among the preceding species (no. 389). I am somewhat doubtful with regard to this determination, as the specimens were not good, and it is not unlikely that Kützing's "species" should be relegated to some other. Each cell possessed two very broad spirals, with irregular margins.

11. *Spirogyra* sp. (sterile). Cells 1–2 times as long as the diameter, with three broad spirals furnished with large pyrenoids. Crass. cell. veget. 78–82 μ. Rather scarce in swampy ponds near Wady (no. 389).

12. *Closterium Leibleinii* Kütz. Amongst the preceding species (no. 389).

13. *Ankistrodesmus falcatus* (Corda) Ralfs var. *spirilliformis* G. S. West. In swampy ponds near mouth of Wady (no. 389).

14. *A. setigerus* (Schröder) G. S. West, Treat. Brit. Freshw. Algæ, 1904, p. 224. [*Reinschiella ? setigera* Schröder in Ber. Deutsch. Bot. Ges. xv. 1897, p. 492, t. 25, f. 4; *Schröderia setigera* (Schr.) Lemm. in Hedwigia, xxxvii. 1898, p. 311.]

Forma minor; long. cum spin. 42 μ; lat. max. 3 μ. With the preceding species (no. 389). In general aspect the specimens were very like British forms of *A. setigerus*, but they were of smaller dimensions than any previously observed examples of this setigerous species. The cells possessed one parietal chloroplast with no trace of a pyrenoid, but the presence or absence of pyrenoids is a very variable feature in the genus *Ankistrodesmus*, and is largely dependent upon nutrition.

15. *Tribonema bombycina* (Ag.) Derb. & Sol. forma *minor* (Wille) G. S. West. Crass. cell. 7–8 μ. Rather rare amongst species of *Spirogyra* in ponds near mouth of Wady (n. 389).

Bacillarieæ.

16. *Melosira Borreri* Grev. General through Birket Qarun and its surroundings, occurring abundantly on the shores and in

the swampy pools of the littoral region, and also in the plankton. It was present in almost all of Dr. Cunnington's collections.

17. *M. varians* Ag. In swampy ponds (no. 389).

18. *M. granulata* (Ehrenb.) Ralfs. In swampy ponds (no. 389). On stones in shallow water (no. 430).

19. *Stephanodiscus Astræa* (Ehrenb.) Grun. In swampy ponds (no. 389).

20. *Diatoma elongatum* Ag. On stones in shallow water (no. 430).

21. *Fragilaria* sp. Valve view lanceolate with obtuse poles; striæ short and coarse, 7 in 10 μ. Length of valve 17–22 μ, breadth 5 μ. In swampy ponds (no. 389).

22. *Synedra radians* (Kütz.) Grun. In shallow water (no. 430).

23. *Cocconeis Placentula* Ehrenb. Attached to the bottom of boat (no. 421); also on stones in shallow water (no. 430).

24. *Navicula gracilis* Kütz. In algal matrix attached to bottom of boat (no. 421), and in shallow water (nos. 430 and 454).

25. *N. producta* W. Sm. In swampy ponds (no. 389), and in an algal scum on surface of stagnant pool (no. 471).

26. *N. avenacea* Bréb.; Cleve Synops. Navic. Diatoms, ii. 1895, p. 15. [*Schizonema Smithii* (Ag.) V. H.] On stones in shallow water (no. 430), and also on mud in a drying-up salt-lagoon (no. 439). The colonies of this diatom in some cases formed a dense yellow-brown stratum.

27. *Gyrosigma elongatum* (W. Sm.). On stones in shallow water (nos. 430 and 448); also in stagnant pool (no. 471).

28. *Amphiprora paludosa* W. Sm. In great abundance on the mud of a drying-up salt-lagoon (no. 439).

29. *Mastogloia exigua* Lewis. On stones in shallow water (no. 430).

30. *Gomphonema parvula* Kütz. In swampy ponds (no. 389).

31. *Rhoicosphenia curvata* (Kütz.) Grun. In swampy ponds (no. 389), and on stones in shallow water (nos. 426 and 430).

Var. *marina* (W. Sm.) Van Heurck. On bottom of boat (no. 421).

32. *Cocconema gracile* (Rabenh.) G. S. West. On stones in shallow water (no. 430).

33. *Amphora salina* W. Sm. On rocks in shallow water (no. 454).

34. *A. coffæiformis* (Ag.) Kütz. Small stagnant pool (no. 471).

35. *Rhopalodia gibba* (Kütz.) O. Müll. On stones in shallow water (no. 430).

36. *R. gibberula* (Ehrenb.) O. Müll. In swampy ponds (no. 389), and in algal scum of stagnant pool (no. 471).

37. *Bacillaria paradoxa* Gmel. Among *Cladophora* on bottom of boat (no. 421).

38. *Nitzschia Palea* (Kütz.) Grun. In swampy ponds (no. 389) and on the bottom of the boat (no. 422); also rare in the plankton (no. 414).

39. *N. communis* Rabenh. In swampy ponds (no. 389).

40. *N. punctata* (W. Sm.) Grun. On bottom of boat (no. 421).
41. *N. fasciculata* Grun. On rocks in shallow water (no. 454).
42. *N. plana* W. Sm. On stones in shallow water (no. 430).
43. *N. Sigma* W. Sm. var. *sigmatella* Grun. In the mud of drying-up salt-lagoon (no. 439).
44. *N. obtusa* W. Sm. var. *scalpelliformis* Grun. On rocks in shallow water (no. 454).
45. *Surirella ovalis* Bréb. In swampy ponds (no. 389).
46. *S. striatula* Turp. In stagnant pool (no. 471).
47. *Campylodiscus Clypeus* Ehrenb. Abundant in the April plankton (nos. 414, 423, and 428); also among other Diatoms on stones in shallow water (nos. 430 and 448).

Myxophyceæ.

48. *Anabæna oscillarioides* Bory var. *tenuis* Lemm. in Kryptogamenfl. Mark Brandenburg, Bd. iii. Heft 2, 1907, p. 189. Crass. cell. veget. 2·8-3 μ; long. spor. 10–17 μ, lat. 4·3–6 μ. In swampy ponds (no. 389).
49. *Nodularia spumigena* Mertens. In ponds near mouth of Wady (no. 393); forming part of scum on surface of stagnant pool (no. 471; with spores).
50. *Cylindrospermum musicola* Kütz. In swampy ponds (no. 389).
51. **Cylindrospermum indentatum,** sp. n. Trichomata flexuosa in thallo gelatinoso parvo et irregulari (2–3·5 mm. diam.) associata; cellulis vegetativis subquadratis vel quadrato-oblongis (diametro $\frac{3}{4}$–$1\frac{1}{2}$-plo longioribus), cytioplasmate granulato; heterocystis elliptico oblongis; sporis singulis, ovato-ellipticis, polo juxta cellulas vegetativas late rotundato, altero juxta heterocystam truncatis et leviter concavis, episporio glabro. Crass. cell. veget. 4·5–5 μ; long. spor. 34–36 μ, lat. 17·5–18·5 μ; long. heterocyst. 9–11·5 μ, lat 5·8-6·5 μ. (Figs. 8–10.)

In ponds near mouth of Wady (n. 393).

This species is well characterized by its elliptic-ovate spores with dissimilar extremities. The pole next the vegetative filament is broadly rounded, while that next the terminal heterocyst is abruptly truncated and slightly hollowed.

It is perhaps nearest to *C. licheniforme* (Bory) Kütz., but differs in its larger vegetative cells, in the peculiar form of its spores, and in its aquatic habit.

52. **Katagnymene palustris,** sp. n. Trichomata solitaria inter algas varias consociata, leviter et gracile curvata, subcurta et crassa; parte apicali subtruncata et cellula apicali convexa; cellulis brevissimis discoideis; vagina mucosa lata achroa et multe irregulari. Crass. cell. 28 μ; long. cell. 2·8–3 μ. (Fig. 17.)

In swampy ponds near mouth of Wady (no. 389).

The genus *Katagnymene* was described by Lemmermann in 1899 (in Abh. Nat. Ver. Bremen, Bd. xvi. Heft 2) to include two marine species collected in the plankton of the Pacific Ocean.

The Egyptian plants were associated with *Zygnema chalybeo-*

spermum Hansg., *Vaucheria sessilis* (Vauch.) DC., *Cylindrospermum indentatum* nob., *Anabæna oscillarioides* var. *tenuis* Lemm., and other Algæ. I have seen but two filaments of it, and the peculiar nature of the mucous sheath precludes its inclusion in any genus other than *Katagnymene*. This sheath was quite colourless, and although rather wide was most irregular in outline. It reached a maximum diameter of about 74 μ.

53. *Phormidium ambiguum* Gom. Attached to bottom of boat (no. 422).

54. *P. Corium* (Ag.) Gom. In drying-up salt-lagoon (nos. 438 and 439).

55. *P. fragile* (Menegh.) Gom. In swampy ponds (no. 389).

56. *P. tenue* (Menegh.) Gom. In ponds near mouth of Wady (no. 393).

57. *Oscillatoria proboscidea* Gom. Crass. trich. 12·5–13 μ. In algal scum on surface of stagnant pool (no. 471).

58. *O. formosa* Bory. In ponds near mouth of Wady (no. 389).

59. *O. animalis* Ag. With the preceding species (no. 389).

60. *O. brevis* Kütz. var. *neapolitana* (Kütz.) Gom. Monogr. des. Oscillar. 1893, p. 249. The trichomes were all subacute and uncinate, and the curious "inflated cells" were very numerous. Crass. trich. 7·5–8 μ. (Fig. 11.) Associated with *O. proboscidea* (no. 471).

61. *O. amphibia* Ag. With the preceding species (no. 471).

Forma *contorta*. Forma trichomatibus subbrevibus multe contortis; cellulis diametro $1\frac{3}{4}$–2-plo longioribus. Crass. trich. 2 μ. In ponds near mouth of Wady (no. 393).

This form occurred amongst the gelatinous matrix of *Cylindrospermum indentatum*, *Nodularia spumigena*, and *Spirulina major*, forming closely coiled filaments of no great length, which resembled irregular coils of rope.

62. *Spirulina major* Kütz. Crass. trich. 1–1·2 μ; diam. spir. 2·5 μ; anfractibus 3·2 μ inter se distantibus. In ponds near mouth of Wady (no. 393).

63. *S. subtilissima* Kütz. Crass. trich. 0·7 μ; diam. spir. 2·8 μ; anfractibus 1·7–1·8 μ inter se distantibus. On stones in shallow water (nos. 426 and 430). In a pure stratum, thrown up on beach (no. 444) and floating in shallow water (no. 451). Also on surface of stagnant pool (no. 471).

64. *S. laxissima* G. S. West, "Alg. Third Tanganyika Exped." Journ. Linn. Soc. Bot. xxxviii. 1907, p. 178, t. 9, f. 6. Forma trichomata in spiram regularem diametro 5–8 μ contorta, anfractibus 15–17 μ inter se distantibus. Crass. trich. 0·7 μ; long. tot. trich. 19–45 μ. (Figs. 2–4.) In drying-up salt-lagoon (nos. 438 and 439).

The Egyptian form differs from the Tanganyika specimens in the slightly greater width of the spirals, which are also very slightly closer together.

65. *Asterocystis smaragdina* (Reinsch) Forti, Syll. Myxophycearum, 1907, p. 691. [*Callonema smaragdinum* Reinsch, Contrib.

Alg. et Fung. 1867, i. p. 41, t. 16. *Allogonium smaragdinum* (Reinsch) Hansg.]

Var. *palustris* Hansg. Prodr. Algenfl. Böhm. 1888, ii. p. 132 (sub *Allogonium*). Forma cellulis quadratis, oblongis, vel oblongo-cylindricis (diam. usque ad 3-plo longioribus), polis rotundatis vel truncatis; filis solitariis, non ramosis (ut visis); tegumento firmo et achroo. Diam. cell. 4·5–8 μ; long. cell. 8–24 μ. (Figs. 12–16.)

Epiphytic on *Polysiphonia utricularis*, floating in shallow water (no. 451).

This variety was described from Bohemia ("in stagnis").

66. *Chroococcus turgidus* (Kütz.) Näg. In algal scum on surface of stagnant pool (no. 471).

PHYTOPLANKTON FROM THE ALBERT NYANZA.

By G. S. West, M.A., D.Sc., F.L.S.

In July, 1907, Mr. R. T. Leiper, M.B., Helminthologist to the London School of Tropical Medicine, who accompanied the recent expedition despatched to Uganda by the Egyptian Survey Department, collected in the Albert Nyanza a sample of plankton and also a tube of material obtained in thirty feet of water. These were forwarded to me for examination by Dr. Cunnington, and the results afford an interesting comparison with the known plankton of the other large African lakes.

Altogether forty-eight species were observed in the plankton collection, none of which could be described as dominant. About two-thirds of these species also occurred in the collection from near the bottom. *Melosira granulata*, *Synedra Cunningtonii*, *Glenodinium pulvisculus*, and certain species of *Tetraëdron* and *Scenedesmus* were fairly common, but most of the other constituents were infrequent. The tow-nettings contained a very large quantity of decaying organic matter, mostly of vegetable origin, and in this respect they resembled Dr. Cunnington's collections in Victoria Nyanza. Entomostraca were not uncommon, and also a number of sponge spicules. A quantity of *Chamæsiphon confervicola* was noticed on some decaying filaments of a species of *Rhizoclonium*. *Staurastrum leptocladum* forma *africana*, *Pediastrum Boryanum* var. *rugulosum*, *Synedra Cunningtonii*, and a form of *Volvox aureus* were of particular interest. A species of *Microcystis* and a large Diatom of the genus *Vanheurckia* have been described as new.

The following is a complete list of the species observed :—

Chlorophyceæ.—*Mougeotia* sp. (sterile; with large cells 30–31 μ in diameter), *Euastrum spicatum* Turn., *Staurastrum leptocladum* Nordst. forma *africana* G. S. West, *St. gracillimum* W. & G. S. West var. *biradiatum* W. & G. S. West, *St. limneticum*

Schmidle (a somewhat reduced form, 5-radiate; long. 33 μ, lat. c. proc. 52–56 μ), *Volvox aureus* Ehrenb. (a form), *Pediastrum simplex* Meyen, *P. duplex* Meyen, and var. *reticulatum* Lagerh., *P. Boryanum* (Turp.) Menegh., and var. *rugulosum* G. S. West, *Cœlastrum cambricum* Arch., *C. reticulatum* (Dang.) Senn, *Scenedesmus acutiformis* Schröder var. *brasiliensis* (Bohlin) W. & G. S. West, *S. denticulatus* Lagerh., *S. obliquus* (Turp.) Kütz., *S. quadricauda* (Turp.) Bréb., and var. *Opoliensis* (Richter) W. & G. S. West, *Ankistrodesmus convolutus* (Rabenh.) G. S. West, *A. falcatus* (Corda) Ralfs var. *acicularis* (A. Br.) G. S. West, *Kirchneriella obesa* W. & G. S. West, *Tetraëdron minimum* (A. Br.) Hansg., *T. trigonum* (Näg.) Hansg., *T. tetragonum* (Näg.) Hansg., and forma *arthrodesmiforme*, *T. regulare* Kütz. (various forms), *T. enorme* (Ralfs) Hansg., *Glœocystis vesiculosa* Näg.

Heterokontæ. — *Ophiocytium capitatum* Wolle var. *longispinum* Lemm.

Bacillarieæ.—*Melosira nyassensis* O. Müll., *M. granulata* Ralfs, *Cyclotella Kützingiana* Chauvin, *Synedra Ulna* (Nitzsch) Ehrenb., *S. Cunningtonii* G. S. West, *Cocconeis Placentula* Ehrenb., *Navicula acrosphæria* (Bréb.) Kütz., *Stauroneis Phœnicenteron* (Nitzsch) Ehrenb., *Vanheurckia africana*, sp. n., *Gyrosigma distortum* (W. Sm.) Cleve var. *Parkeri* (Harrison) Cleve, *Gomphonema africanum* G. S. West, *Epithemia turgida* (Ehrenb.) Kütz., *Surirella Engleri* O. Müll. var. *constricta* O. Müll. (long. 209 μ; lat. max. 44 μ), *Cymatopleura Solea* W. Sm.

Myxophyceæ.—*Lyngbya contorta* Lemm., *Oscillatoria princeps* Vauch., *O. tenuis* Ag., *O. formosa* Bory, *Merismopedia elegans* A. Br. (colonies with upwards of 3000 cells), *Microcystis densa*, sp. n.

Peridinieæ.—*Glenodinium pulvisculus* (Ehrenb.) Stein, *Peridinium inconspicuum* Lemm.

Flagellata.—*Phacus pleuronectes* Nitzsch.

Of the above forty-eight species, twenty-four (or 50 per cent.) are *Chlorophyceæ*, fourteen (or 29·1 per cent.) are *Bacillarieæ*, and only six (or 12·5 per cent.) *Myxophyceæ*.

The following require special mention:—

Volvox aureus Ehrenb. The specimens differed in several particulars from the European forms of this species. The number of daughter-colonies developed within the mother-colony were fewer than is usually the case, and their growth is such that they become ellipsoid or ovoid by compression before being set free. I hope to deal specially with this form at a subsequent date.

Tetraedron tetragonum (Näg.) Hansg. forma arthrodesmiforme. Cellula in aspectu generali ad speciem *Arthrodesmi* accedens; in parte mediana subconstricta, angulis in spinos elongatos subparallelos productis. Lat. cell. sine spin. 16–22 μ; lat. max. cum spin. 56 μ. (Fig. 1.)

Vanheurckia africana, sp. n. Cellula ut in visa aspectu valvulari rhomboideo-lanceolata, polis obtusis; nodulo centrali paullo elongato; striis validis et conspicuis, iis transversis 10 in 10 μ, iis longitudinalibus 9 in 10 μ; long. valv. 196 μ; lat. max. 44 μ. (Fig. 18.)

This large and handsome species has the same outward form as *V. rhomboides* (Ehrenb.) Bréb., but the valves are of considerably larger dimensions, and both the longitudinal and transverse striations are much coarser than in any known form of that species.

Lyngbya contorta Lemm. in Forschungsber. Biol. Stat. Plön. vi. 1898, p. 202, t. 5, f. 10–13. The filaments were 1·6–2 μ in diameter, and twisted into fairly close spirals. (Fig. 5*a* and *b*.) I am in considerable doubt as to its correct identification, and the examples tend to confirm my previous remarks,* and also the suggestions of Ostenfeld,† that the limnetic species of *Lyngbya* require complete revision. The specimens from the Albert Nyanza do not agree with *L. circumcreta*, differing especially in the narrower and more extended character of the spirals. Ostenfeld (*l. c.* p. 335) seems to me to be in error in placing both *L. contorta* and *L. circumcreta* under *L. Lagerheimii*. Two apparently distinct species occur in the large African lakes, which I have previously recorded as *L. Lagerheimii* and *L. circumcreta*. I freely admit that I may be wrong in both determinations, but I am convinced that the plants I have so recorded are not forms of one species.

Microcystis densa, sp. n. Cellulæ globosæ, læte æruginosæ, 4 μ crassæ, *pseudovacuol.* absentæ, in coloniis permagnis (long. 1400 μ, lat. 415 μ) densissime confertis; coloniis elongatis et subcylindricis, polis rotundatis versus attenuatis. (Figs. 6–7.)

This species stands near to *M. pulverea* (Wood) Migula in the crowded nature of its cells and in the absence of "pseudovacuoles" (gas vacuoles), but the cells are rather larger and the colonies of vastly greater dimensions.

Description of Plate 498.

Fig. 1. *Tetraëdron tetragonum* (Näg.) Hansg. forma *arthrodesmiforme*. × 500. 2–4. *Spirulina laxissima* G. S. West forma, × 1000. 5*a* and *b*. *Lyngbya contorta* Lemm., × 1000. 6–7. *Microcystis densa*, sp. n. 6. Entire colony, × 35; 7. A few of the cells, × 500. 8–10. *Cylindrospermum indentatum*, sp. n., × 500. 11. *Oscillatoria brevis* Kütz. var. *neapolitana* (Kütz.) Gom., × 500. 12–16. *Asterocystis smaragdina* (Reinsch) Forti. All × 500. Fig. 13 is the earliest stage in the formation of a new plant; fig. 14 is one of the adult filaments. 17. *Katagnymene palustris*, sp. n., × 500. 18. *Vanheurckia africana*, sp. n., × 500. The striations are only indicated on a small area of the valve.

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* G. S. West in Journ. Linn. Soc. Bot. xxxviii. 1907, p. 175.

† C. H. Ostenfeld, "Phytoplankton aus dem Victoria Nyanza," Engl. Bot. Jahrbüch. v. 1908, p. 335 (c. fig. 2).

THE COLLECTION AND IDENTIFICATION OF ROSES.

By the Rev. A. Ley, M.A., and Major A. H. Wolley-Dod.

It is hoped that a few notes on the subject of the above heading may facilitate the study of our British roses, in which, it may be feared, we have fallen considerably behind Continental authors. There has no doubt been a tendency on the part of the latter to establish species on inadequate grounds; British authors, on the contrary, have been too conservative, in some cases only recognizing considerable aggregates, and in others continuing the use of totally incorrect names. We venture to suggest that the latter fault has been due to the too confident acceptance of names which have been given, doubtless in error, by competent authority, without any attempt at comparison with authors' descriptions or with Déséglise's magnificent collection of roses at South Kensington, which was purchased by the Natural History Museum in 1884.

The determination of specimens is often much hampered by their inadequacy. They are, as a general rule, collected too young. The size and colour of the flowers are all that is lost by late collection, and though these have their importance, they are far less indispensable than fully-developed fruit, without which it is often not easy to determine even the group to which an example should be referred. Specimens are also very commonly too small. The end of a flowering-shoot rarely shows characteristic prickles, which are to be found on the barren shoots, or on the old stems from which the flowering-shoots grow. Either of these are admissible, but the very strong shoots of the year, arising from the rootstock, should be avoided, because their strength gives deceptive characters to the prickles and leaves which they bear.

A few notes on the characters afforded by the various organs may be helpful.

Habit, colour, &c.—As with *Rubus*, so with *Rosa*, there is much to be deduced from the habit and general appearance. The direction of the stem, and its colouring, as well as that of the foliage and prickles, though not easy to express in words, may often help towards identification. Notes made on these points at the time of gathering are always useful. At least the colour and appearance of the leaves can be stated, *i. e.* dark or pale, glaucous or green, dull or shining, thick or thin, convex or flat, &c. The habit is often lost when the bush grows in a hedge; either it is abnormally drawn up, or it suffers from clipping; but some idea of its height, erection, and general habit can usually be obtained. The straightness or curvature of the barren shoots, and the alignment of their internodes, in some groups at any rate, such as those of the subsection *Villosæ*, present characters of considerable importance, and should always be noted.

Prickles.—To judge from all modern descriptions, these are very important organs. Their number, size, shape, and range of

variation are always carefully described, and though less constant in these respects than one would expect, no specimen is perfect in which they are not well represented. As has already been stated, those on the flowering-shoots are usually of little value; a piece of the old stem with the flowering-shoot attached should, if possible, always be gathered. Failing that, a piece of a well-developed but not abnormal shoot of the year may be taken. Very young plants, and sometimes young shoots of the year, often show a mixed armature which is not characteristic. Such should be avoided. In all the *R. spinosissima*, *R. involuta*, *R. hibernica*, and *R. Eglanteria* groups, more or less mixed armature is the rule, but the mixture is not always uniformly distributed. In the subsection *Villosæ* mixed armature may be suspected to arise from hybridity, but in certain species of this group considerable variation of curvature of the main prickles occurs. If these characters cannot be adequately represented by specimens, note should be made of them. In some species there is a tendency to elimination of the prickles, especially on the flowering-shoots, and specific characters have been founded upon this. We have found it too variable a feature to be of more than secondary importance.

Leaflets.—The number of leaflets in many groups is of little importance, varying from seven to nine. In a few species variation from this number is tolerably constant, e. g. *R. collina* Jacq. and *R. micrantha* Sm. usually have five, while in *R. spinosissima* nine is the prevailing number. Their spacing on the petioles, and that of the whole leaves on the branches, varies a good deal, so as to give many of the species a characteristic appearance of laxity or denseness.

The shape and size of the leaflets are subject to considerable variation in the same species, and though described with much minuteness, are not, as a rule, very helpful in determination of the species. This is, doubtless, partly due to the want of uniformity in the meaning of the adjectives denoting size and shape under the pens of different authors, though there is also much real variation. But these characters are not negligible. A species which normally has small leaflets will seldom produce very large ones, nor is a species which usually has them lanceolate likely to be found with orbicular ones. The terminal leaflet is the one which is generally described. Some authors describe the lateral ones also, but their form is even less constant, as is the length of their petiolules.

Their serration has always been regarded as a primary character. It naturally falls into two categories, "simple" and "compound." In the former the primary teeth are not again serrulate; in the latter they are so. These divisions, however, are capable of considerable subdivision. Simple serration may be "uniform" when the teeth are of approximately uniform size and depth, or "irregular" when they are not so. A modification of irregular serration shows large and small teeth alternately, each being fairly regular in size, but as the secondary teeth come

between and not upon the backs of the primary ones, the serration cannot be called "compound." In compound serration the denticles may be one or several on the back of each primary tooth, or they may be found on the front as well.

We have therefore the following classes :—

1. Simple
   - (*a*) Uniform.
   - (*b*) Irregular.
2. Compound
   - (*c*) With a single denticle on the back of each primary tooth.
   - (*d*) With two or three denticles on the back of each primary tooth.
   - (*e*) With denticles on both sides of the primary teeth.

The difference between (*a*) and (*d*) or (*e*) is always clear and definite, but the adjacent subdivisions run into one another, and the same bush may present serration varying from (*a*) to (*d*). This is often described as "irregular serration" by Continental botanists, some of whom form a subgroup of "*Transitoriæ*" between the *Lutetianæ* and *Dumales*, but this does not help to elucidate matters on account of the inconstancy of the character. Class (*e*) is perhaps the most constant, and in both (*d*) and (*e*) the primary teeth are much more uniform than in (*a*) to (*c*); but even here variation in the depth of the denticulation may occur, so that the leaflets become triserrate. This is frequently the case in the subsection *Villosæ* and their hybrids under *R. involuta*. The teeth may also vary in width, affecting the angle or acumination of the apex, also its direction, both of which are readily apparent to the eye but not easily described, though they have some importance in the determination of the species. The apex of each denticle may be glandular or not, but the presence or absence of glands is not a very constant feature, even in individuals of the same species.

The hairiness of the leaflets is important, inasmuch as the appearance of the least quantity of hair on the midribs may cause the removal of an example from a group in which they should be glabrous, though it appears that too strict an adherence to this rule results in the dissociation of species otherwise identical. There are, however, extremely few exceptions to this rule in Déséglise's herbarium. But hairiness, once admitted, may vary greatly among the individuals of one species or variety. Some species are described as having their leaflets hairy above as well as beneath, but this character may be deceptive because the hairs on the upper surface are often deciduous, and at the best we have not found it to be a very constant character. On the under surface the hairs may be on the midrib only, or on it and the principal nerves, or all over. In modern subdivision these three degrees are always recognized, but no hard-and-fast line can really be drawn as to the amount and distribution. Its nature does not vary greatly, the soft or harsh feeling of a hairy leaflet depending rather upon the denseness of the hair than on its quality, but differences are

observable and should be noticed as subsidiary characters of some importance.

Subfoliar glands are organs of considerable importance, whole groups depending primarily upon their presence or absence. They may be divided into classes according to their size and distribution. Thus they may be stalked and usually coloured, as in the subsection *Rubiginosæ*, or they may be sessile, in which case they are less usually coloured, but may be conspicuous, as the *R. Borreri* group, or in many of the subsection *Villosæ*, or small and inconspicuous, as in others of the *Villosæ*, or some of the *R. coriifolia* group. Going further still, the glands may become almost invisible except through a strong lens, such occurring in the last-mentioned group, also sometimes in the *Dumales*. It requires considerable experience to determine the degree of development at which these very small glands, which we have called "microglands," should be reckoned as glands, but for the present we suggest that only those glands which are either visible to the naked eye, or are readily seen with a low-power lens, should be so reckoned.

The position of the glands is also of the greatest importance. They may occur only on the midribs, in which case, though not negligible, they are not of importance, but when they occur on the secondary nerves they are much more significant, usually constituting a group character, and still more so when they are found on all the veinlets, so as to be apparently spread over the whole under surface. There is often a tendency for the subfoliar glands to be collected near the margins of the leaflets, especially on the flowering-shoots, and in doubtful cases these should always be examined.

We may therefore classify subfoliar glands as follows :—

(1) Sessile, small, and inconspicuous (microglands).	(*a*) On midribs only.
(2) Sessile or subsessile, but larger and sometimes dark-coloured.	(*b*) On midribs and secondary veins.
(3) Stipitate, conspicuous, and usually dark-coloured.	(*c*) On all the smaller veins, at least towards margins.

Petioles. — These have importance only in respect of their clothing, and then only with rather wide variation. In comparatively few species are the petioles quite free from hairs, and in still fewer from glands. Even in *R. lutetiana* Lém. a few glands are frequently seen on the petioles, though they are normally quite eglandular, as is also the case with some species of the groups *R. dumetorum* and *R. glauca*. Almost all others have them somewhat glandular. A few fine hairs may be found at the origin of the petiolules, or even all along the upper surface of petioles in many of the species of the *Lutetianæ* and *Dumales* subgroups, and in the group of *R. glauca*, in all of which the petioles are normally glabrous; while in those groups which have hairy leaflets, the petioles are always hairy. The hairs may be loose

and long, or may form a dense pubescence, which may hide the glands, or may be very short and close. These differences may give auxiliary characters for the determination of species.

Stipules.—Much has been made of the shape and clothing of these organs and their auricles by Continental authors. We have found them more reliable as group than as specific characters. Thus, in the *R. glauca* group, a prominent feature is the broadness of the stipules and auricles. In the *R. pomifera* group they are broad also, with the auricles shorter and broader in proportion as compared with neighbouring groups, whilst the upper auricles are falcately incurved, instead of being porrect or diverging.

Inflorescence.—Excepting that in some species solitary flowers prevail, while in others they are more often in a cluster, the inflorescence, as a whole, is not of much value as a character. The number of flowers in a cluster seems to depend largely upon strength of growth. The whole of one part of a bush may bear solitary flowers, and another part, or a few strong shoots, may have them clustered, and in comparatively few species is there any approach to constancy.

Bracts.—In descriptions quite a disproportionate amount of space is given to describing the shape and size of the bracts relative to their importance, which is in our opinion usually very small. To some extent the development of the bracts is in inverse ratio to that of the peduncles, species with short peduncles usually having large and broad bracts, and *vice versâ*, and though this may sometimes be more apparent than real, the character is not negligible; most of the members of the *R. coriifolia* group, for example, may be known by their large broad bracts, while those of the *R. stylosa* group have them narrow. The clothing of the bracts is as variable as that of the stipules, and is of little real value.

Peduncles.—The peduncles give important features by their clothing and length. The presence or absence of glandular setæ on the peduncles is the sole feature by which the *Hispidæ* or *R. andegavensis* subgroup are separated from the *Lutetianæ* and *Dumales*, and they are almost universally present in the subsection *Villosæ* and the *R. Eglanteria* groups. The two latter contain each one or two exceptional species with eglandular peduncles, but to find more than a very occasional adventitious gland on those of the *Lutetianæ* or other smooth-peduncled subgroups or groups is as rare as it is to find hairs on the midribs of glabrous-leafleted groups. This rigid adherence to technical characters sometimes results in the separation of closely allied species into widely different groups, and this disregard of natural affinities has sometimes been obviated by authors admitting both glandular and eglandular peduncles into the same species, thus rendering their identification by technical characters difficult, though perhaps really a more rational treatment. In a few species hairy peduncles are usual, but hairs may also sometimes occur in many species, so that the character appears to us of minor importance.

The length of the peduncles varies considerably, not only

really, but also apparently, in comparison with the length of the fruit, small fruits often having the effect of making the peduncles look longer than they actually are. We believe length to be of much importance, though much variation is tolerated by foreign botanists. In many cases it is a primary group character; for example, one of the features by which the *R. Sherardi* group is distinguished from that of *R. tomentosa* is the short peduncles of its species; long peduncles are a leading characteristic of the *R. stylosa* group, and short ones of *R. coriifolia*. We think the length of the peduncle relative to the *fully developed* fruit is often a helpful characteristic, though actual measurement is better.

Sepals.—Very great importance attaches to the direction of the sepals and their persistence on the ripening fruit, some also to their degree of pinnation, but not much to their clothing with hairs or glands. Taking the last feature first, it is usual for sepals to be tomentose within, and for the tomentum to extend round the edges so as to form a narrow or wide border on the back, and sometimes the back is hairy all over, but these points are of small importance. More or less numerous glands on the edge, especially on the tips of pinnules, are found in very many species, and much stress has sometimes been laid on their presence or absence as a specific character by which two allied species may be distinguished, but to judge from authentic specimens it is not of much value. Broadly speaking, it is not to be expected that even aberrant examples of a species which normally has no glands on the edges of its sepals would usually show many, but their presence or absence is very variable. Glandular development on the backs is of greater importance, but care must be taken to distinguish glands from a warty or scabrous surface, Throughout the subsection *Villosæ* and the group of *R. involuta* the sepals are usually very glandular on the backs, but are comparatively rarely so among the subsection *Eu-caninæ*, except in the glandular-leaved members of the *R. coriifolia* group.

The degree of pinnation, though liable to much variation in the same species, is important. In the section *Pimpinellifoliæ*, also in species allied to *R. pomifera* Herrm., entire or subentire sepals are the rule, while in the *R. tomentella* group and in most of that of *R. tomentosa* they are much divided. In the rest there is much variation, not wholly to be disregarded, but we think to be treated as a group rather than a specific character.

The direction of the sepals on the maturing fruit, and still more their persistence, are perhaps the most important features of all, so far as prominence can be given to the characters afforded by any single organ in the genus. The difference between closely reflexed and quite erect sepals is most marked, but it is not easy to define all the intermediate steps; moreover, their direction often varies with the age of the fruit, and is more or less altered or obscured by pressure in drying, so that much experience is required before a reliable opinion can be deduced from them. Though, generally speaking, a group rather than a specific character, the direction of the sepals must not be too rigidly

regarded as such. As Crépin used to point out, sepals which spread horizontally or even rise above the disc occur occasionally among the subgroups *Lutetianæ* and *Dumales*, in which reflexed sepals are the rule, while they may be found reflexed in members of the *R. coriifolia* and *R. glauca* groups, which usually have them erect. Notes as to the general direction of the sepals made at the time of gathering, especially if they can be made at an earlier and a later date than that of collecting, are useful aids to the determination of specimens, which cannot always adequately represent them.

As stated in the last paragraph, the persistence of the sepals is a most important point, which is very little liable to variation. In the whole of the subsection *Eu-caninæ*, except the *R. coriifolia* and *R. glauca* groups, they all or very nearly all fall before the fruit reddens. They are a little later in the *R. tomentosa* group, later still in that of *R. Sherardi*, in which they persist till the fruit is fully ripe, while in the groups of *R. spinosissima* and *R. pomifera* they persist till the fruit itself decays. The *R. involuta* and *R. hibernica* groups and the subsection *Rubiginosæ* contain species or varieties which show varying persistence in their sepals; some having them erect and persistent till the fruit ripens, others having them spreading or even reflexed and falling early. On account of the importance of this character for the determination of species, we advocate late rather than early collecting. The most useful information can be gathered from fruits sufficiently advanced to have changed colour, but when decay has not begun to set in, at least among those groups in which persistent sepals are the rule; in the groups having deciduous sepals, somewhat earlier gathering is desirable, as if the sepals have all fallen their character is lost altogether, but the fruit should be fully developed.

Petals.—Except in size and colour, these present no special features, and even those are of secondary importance. Though we cannot assert it to be a fact, it is probable that considerable variation occurs both in size and colour of the petals in the same species. Still, in some white, and in others pink flowers prevail, the latter colour becoming deepest in the *R. pomifera* group. As a rule the claws of the petals are yellow, but sometimes they are concolorous with the lamina. In some of the subsection *Villosæ*, more especially in the *R. pomifera* group, the petals are ciliated with glands at the apex, and have also hairy claws, both on the edges and backs, but we do not think much specific importance should be attached to this.

Styles.—These are of considerable importance, and their value has, we think, been underestimated by British botanists. Their length, or rather the amount of projection above the disc, their degree of cohesion, and their hairiness all give characters of primary importance. In the section *Synstylæ* the styles are always firmly united into a glabrous column, and in the *Stylosæ* they are usually so. Such cohesion may sometimes be noticed in the *Eu-caninæ*, though it is not characteristic of that subsection. Species in which it occurs can be referred to the *Eu-caninæ* sub-

section by means of the stigmas being in a flattish or hemispherical head, not in a more or less elongate cone, as in the *Synstylæ* and *Stylosæ*.

The degree of hairiness is also important. We think a division into glabrous, thinly hispid, hispid, and, woolly is sufficient for general purposes, and as with other organs, some latitude for variation must be expected. We do not think that any tangible variation in the quality of the hair occurs, though foreign authors use different words descriptive of the quality, just as we do, *e. g.* "hispid" and "woolly," but the difference appears to be solely one of degree. The stigmas may be papillose or not, but we do not think importance need be attached to this. Only the hairs on the filaments are of significance.

Fruit.—The shape of the fruit is liable to considerable variation, even upon the same bush, especially when it occurs in clusters; the central or primordial fruit is often very much more elongate than the lateral ones. This characteristic is seldom mentioned in descriptions, but while the solitary fruits, or, in their absence, the outer ones of the clusters give the shape which is usually described, that of the primordial fruit is in certain cases important. They may be classified as globose, ovoid, urceolate, obovoid or pyroid, and ellipsoid, or may lie between these forms. We use the term "ellipsoid" of a figure of which the length is at least twice the breadth. It should be mentioned that the foreign adjectives of form do not exactly correspond to the English, distinctions being drawn between "*globuleux*" and "*sphérique*," or between "*oval*" and "*eiförmig*," which cannot always be exactly rendered in an English translation. The shape of the calyx-tube is always described by foreign authors, but in our experience this is liable to great variation, according to the degree of development of the flower, and except as an inefficient substitute for the shape of the fruit is of doubtful value. Generally speaking, the calyx-tube becomes more inflated as the fruit develops, so that a globose calyx-tube may safely be taken to indicate a globose fruit, but a very elongate calyx-tube is very unlikely to produce even a subglobose fruit.

The date of ripening is important as distinguishing some groups from their allies, *e. g.* the *R. pomifera* and *R. coriifolia* groups mature their fruit earlier than those of *R. tomentosa* and *R. dumetorum*. The colour of the fruit is another point which has not been much studied in Britain, but which is of specific value, also the development and especially the degree of elevation of the disc or space between the styles and the stamens. For example, the disc is remarkably conical throughout the section *Stylosæ*, and is narrow in the *R. pomifera* group.

In conclusion, we would remind students of the genus that no single character taken by itself must be held to be conclusive, so that analytical keys must be used with caution. Thus varieties of the subsections *Villosæ* and *Rubiginosæ* are known which have smooth peduncles, or, in the former group, showing glabrous leaflets, or eglandular ones in the latter. The amount of hair,

glandular development, degree of dentition, &c., are all liable to much variation in the same species, and it is only by a consideration of the characters collectively that a sound decision can be arrived at. The characters presented by the various organs are not all of equal weight, and the value of each varies with the different groups, besides the fact that a certain feature may be an important group character in some subsections, but of little value even as a species character in others. It is difficult, therefore, to lay down precise rules, but we should feel inclined, on the whole, to give greater weight to the features in the first of the subjoined classes than to the second. The organs enclosed in brackets are those which might be placed in either class, according to the group or subsection to which the species under consideration belongs:—

Of primary importance.

Habit.
Direction of stem.
(Prickles, size and shape.)
Leaflets, serration and clothing.
Peduncles, length and clothing.
Sepals, direction and duration.
Fruit, time of ripening, shape, and size.
Styles, cohesion and hairiness.
(Disc, shape.)

Of secondary importance.

Colour of stem and foliage.
(Prickles, number.)
(Leaflets, size and shape.)
Leaflets, number.
Petioles, clothing.
Stipules and bracts.
Peduncles, number.
Sepals, pinnation and clothing.
Fruit, colour.

Abnormal characters may appear in individuals, and may be easily recognizable as such or not. Thus a strong development in the barren shoots giving rise to abnormal leaflets and prickles should be obvious to a collector and should be avoided. But the fact that a fruit has shrivelled in drying so as to make the styles project more than they did in the fresh state is an abnormality which is not obvious; also when, as Crépin often pointed out, the sepals rise accidentally, which may affect only a few fruits on the whole bush. Such abnormalities may be very deceptive, and their existence emphasizes the necessity for botanists being guided by collective characters, and not by a single feature alone.

SOMERSET PLANT-NOTES FOR 1908.

By Rev. E. S. Marshall, M.A., F.L.S.

Owing to the arctic spring, the torrid summer, which turned the whole countryside brown during July and August, and the effects of a severe illness, I could do but little active work during last season. However, thanks to the kindness of Miss M. A. Livett, of Clevedon, who transcribed sundry notes in Rev. R. P. Murray's own copy of the *Flora of Somerset*, and sent me some interesting letters to him from botanical correspondents, there is sufficient material for a paper.

Districts 1 to 4 are in v.-c. 5 S. Somerset, the rest in v.-c. 6; an asterisk denotes a new vice-comital record.

By far the most interesting recent discovery in the county is that of *Euphrasia minima*, recorded in these pages from several stations on Exmoor in district 1, and from Porlock Weir, district 2. This is a very unexpected addition to the British list, being elsewhere a decidedly alpine species, though found as far westwards as the Pyrenees and northern Spain; its occurrence here is parallel to that of the almost equally alpine *E. salisburgensis* in Ireland. A single fresh specimen was sent to me, without fruit, and with only one flower remaining, which had faded to a bluish lilac, with hardly any trace of the original yellow. This led me to suggest that it might be a dwarf colour-variation of *E. curta* var. *glabrescens*, which it much resembled in habit; but Prof. R. von Wettstein has definitely pronounced that the Somerset plant belongs to true *E. minima*.

Thalictrum flavum L. 3. Ditch-sides between N. Newton and Athelney; scarce.

Ranunculus auricomus L. 3. Corfe.

Aquilegia vulgaris L. 3. On a pollard willow, south of N. Newton; probably a garden escape. 10. Houndstreet, *D. Fry*.

Berberis vulgaris L. 3. Halse, *H. S. Thompson*.

Papaver hybridum L. 2. Shurton Bars, 1897, *Rev. C. W. Whistler*.

Radicula palustris Moench. 3. Near Maunsel. Bridgwater, *H. S. Thompson*.

Erophila præcox DC. 3. N. Newton; N. Petherton. 9. Churchill.

Draba muralis L. 8. Near Shepton Mallet, *H. S. Thompson*.

Diplotaxis muralis DC. 8. Highbridge and Burnham, *H. S. Thompson*.

Lepidium campestre Br. 3. Rocky ground near Overton, W. Monkton; very local and in small quantity, but I think native.

Viola canina Fr., 'L.' 9. Worle Hill, *Mrs. Gregory*.

Polygala vulgaris L. 9. Plentiful on Mendip, where it was observed in 1883 by Rev. R. P. Murray and myself, though not definitely recorded by him for this district. — *P. oxyptera* ascends to fully 800 feet between Draycott and the head of the Cheddar Gorge.

**Lychnis alba* × *dioica*. 2. Hedge above Greenaleigh Point, near Minehead; growing with *L. alba*, which it more nearly resembles, though I believe that it is the hybrid. 3. W. Monkton, with the parents; a good intermediate, apparently fertile. Not previously recorded from the county.

Cerastium tetrandrum Curt. 9. Sandy coast, Weston-super-Mare, in plenty.—*C. pumilum* Curt. 9. Worle Hill, *Mrs. Gregory*.

Mœnchia erecta Gaertn. 2. Holford Combe, 1898, *H. Corder*.

Stellaria aquatica Scop. 2. Williton. 4. Chard Reservoir.

Sagina ciliata Fr. 10. Brislington; abundant, *D. Fry*. — *S. subulata* Presl. 2. Danesborough, *H. Corder*. — *S. nodosa* Fenzl. 9. Failand, *D. Fry*.

Spergula arvensis L. 9. Field on Mendip, between Draycott and Cheddar Gorge, at 700 feet.

Hypericum montanum L. 5. Near Dunball, *H. S. Thompson.*

Geranium pyrenaicum Burm. fil. 10. Corston; in plenty, *D. Fry.*—*G. pusillum* L. 10. Brislington, *D. Fry.*—*G. rotundifolium* L. 9. Mr. Fry wrote to R. P. Murray: "I much doubt the occurrence of this either at Clevedon or Yatton."—*G. Robertianum* L. var. *modestum* (Jord.). 3. Locally abundant on hedge-banks, W. Monkton. Anthers black-purple; petals of a brighter, purer red than in the type, their limb not exceeding the claw; carpels slightly hairy near their apex. — Var. *purpureum* (Vill.). 2. Shingly beach near the harbour, Minehead. Anthers orange; calyx usually glabrous; carpels glabrous.

Erodium cicutarium L'Hérit. 9. Ascends to 700 feet on Mendip, near Draycott. — *E. moschatum* L'Hérit. 5. Near Stawell, *H. S. Thompson.* 9. The small early blooming plant of Purn Hill. Bleadon, appears to be the var. *minor* Rouy & Fouc. — *E. maritimum* L'Hérit. 2. Coast near Bossington. 9. Near Loxton, *H. S. Thompson.*

Rhamnus catharticus L. 9. Slopes of Mendip, above Draycott. —*R. Frangula* L. 3. Near Huntworth, *H. S. Thompson.*

Medicago denticulata Willd. 3. Cornfield near Curry Rivel, *R. P. Murray.*

Trifolium striatum L. 9. Brean Down, *D. Fry.* Ascends to over 800 feet on Mendip, above Draycott. 10. Near Keynsham, *D. Fry.* — *T. scabrum* L. 8. Burnham, *D. Fry.* 9. Reaches 400 feet, above Draycott.—*T. fragiferum* L. 9. Kewstoke, *R. P. Murray.*

Vicia gracilis Lois. 8. Between Bawdrip and Cossington, *H. S. Thompson.*—*V. Orobus* DC. 10. Between Stoke St. Michael and Coleford, two or three miles up stream from Mells, July, 1902, *Miss C. E. Horner.*

Lathyrus Aphaca L. 8. Between Bawdrip and Cossington, *H. S. Thompson.*—*L. Nissolia* L. 2. Cliff, Kilve, *H. S. Thompson.* 10. Brislington, abundantly, *D. Fry.*

Prunus Cerasus L. 2. Bossington.

Rubus Koehleri Wh. & N. var. **cognatus* (N. E. Br.). 2. Bossington, in shade; found by Mr. S. H. Bickham and myself, and named by Rev. W. Moyle Rogers. The variety is new for Somerset. — *R. acutifrons* Ley. 7. In a letter to R. P. Murray, September, 1901, Rev. A. Ley mentions that the Pen Selwood plant is his var. *amplifrons.*

Geum rivale L. 3. Park Wood, Milverton, *E. G. Aldridge.*

Potentilla verna L. 9. Crook Peak, *H. S. Thompson.*

Rosa micrantha Sm. 2. A specimen from the coast, Minehead, which I sent to Prof. H. Dingler, of Aschaffenburg, is referred by him to var. **permixta* (Déségl.), not previously observed in Somerset.—*R. agrestis* Savi. 9. The round-fruited plant from near Uphill, "seems to come very near the var. *Belnensis* Ozanon" (Dingler, *in litt.*); Major Wolley-Dod informs me that M. Sudre named it *R. arvatica* Puget, which he himself had previously

suggested to me. The rather small petals are pinkish or flesh-coloured.

Pyrus latifolia Syme var. *decipiens* (Bechst.). 10. In 1901, Rev. A. Ley observed at least four trees in Leigh Woods; previously but one was known there.

Saxifraga tridactylites L. 9. Ascends to 700 feet on Mendip, above Draycott.

Chrysosplenium oppositifolium L. 3. Broomfield.—*C. alternifolium* L. 1. By the Barle, above Dulverton, *H. S. Thompson.*

Sedum album L. 9. I believe that this is native in the Churchill station; it grows on the limestone cliff above the road, as well as on the embankment below it, and I saw none on the neighbouring cottage garden-walls. — *S. rupestre* L. 9. Roadside wall near Winscombe. — *S. Forsterianum* Sm. var. *glaucescens* Wats. 2. Plentiful and well-marked on the coast between Minehead and Hurlstone Point. I have been unable to find true *S. rupestre* in that neighbourhood, and believe the records for Greenaleigh and Porlock Weir to have been mistaken. These two species are very closely allied, though quite distinct; thus they are almost impossible to separate when dry, unless the fresh specimens have been plunged into boiling water, and great care is taken in changing them while under pressure.

Callitriche intermedia Hoffm. (*hamulata* Kuetz.). 3. Abundant in ditches on Northmoor, between Maunsel and Athelney. 9. Bleadon. — *C. obtusangula* Le Gall. 3. With the former on Northmoor, though less plentiful. 10. The Bristol citation from Nyman should be expunged (note in Murray's copy).

Peplis Portula L. 2. Danesborough, *H. Corder.*

Epilobium angustifolium L. 3. Between Broomfield and N. Petherton. — *E. tetragonum* Curt. (*adnatum* Griseb.). 9. Bleadon.

Hydrocotyle vulgaris L. 3. Near Maunsel.

Trinia glauca Reichb. fil. 9. Crook Peak, and above Compton Bishop, *H. S. Thompson.*

Sison Amomum L. 3. N. Newton.

Anthriscus vulgaris Bernh. 3. Bridgwater, *H. Corder.* 8. Sands at the mouth of the Brue, *H. S. Thompson.*

Œnanthe pimpinelloides L. 3. Common about Bridgwater and Durleigh, *H. S. Thompson.*—*Œ. aquatica* Poir. (*Phellandrium* Lam.). 8. Ditches about Huntspill, Highbridge, and Burnham, *H. S. Thompson.*

Daucus Carota L. 2. A very hispid form, usually much branched from the base, occurs in quantity on stony ground at Greenaleigh Point, near Minehead; I have as yet obtained no special name for it. Plants were grown in my garden, and the fruit appeared to be normal.

Adoxa moschatellina L. 3. Bromfield.

Galium erectum Huds. *2. Abundant in a meadow on the lias, a little east of Washford Station, and north of the railway; in good flower on June 9th. There was previously some little doubt about its occurrence in the county. — *G. Mollugo* L. var.

Bakeri Syme. 9. Sparingly in Cheddar Gorge. — *G. asperum* Schreb. (*sylvestre* Poll.). 9. At 855 feet on Mendip, above Draycott. —*G. palustre* L. var. *Witheringii* (Sm.). 9. Near Uphill.

Asperula cynanchica L. 9. Limestone downs near Bleadon.

Valeriana officinalis L. (*Mikanii* Syme). 8. Loxley Wood, on the Poldens, *H. S. Thompson.*

Kentranthus ruber DC. 9. Limestone rocks on Purn Hill, Bleadon, well established; several of the plants have scarlet flowers, but the colour changes to rose in drying.

Chrysanthemum Parthenium Bernh. 2. Bossington.

Matricaria inodora L. var. *salina* Bab. 2. Coast, Williton.

Tanacetum vulgare L. 3. Near N. Newton.

Senecio erucifolius L. 3. About Lyng and N. Newton. 9. Uphill.

Carduus pycnocephalus L. var. *tenuiflorus* (Curt.). 2. Stockland, *Rev. C. W. Whistler.*

Picris echioides L. 3. Maunsel.

Crepis taraxacifolia Thuill. 2. Watchet.

Hieracium Schmidtii Tausch. 2. The Minehead plant, which grows on the cliffs as well as in Murray's more restricted station, is not var. *devoniense* F. J. Hanb., but quite characteristic var. *eustomon* Linton. 9. The Cheddar station must be expunged; Dr. Elfstrand (in herb. Hanbury) noted that the specimens so named were not *H. Schmidtii*, and Rev. A. Ley has shown it to me there as his *H. cyathis*. *H. rubiginosum* F. J. Hanb., discovered by Mr. Ley some years ago, seems to be scarce and local; it is identical (*teste* W. R. Linton) with a Cheddar specimen in Herb. Brit. Mus., misnamed *H. flocculosum.*

Taraxacum erythrospermum Andrz. 3. Sandy roadside hedge-bank near Maunsel, in N. Newton parish.

Limonium vulgare Mill. 9. A good patch, on mud near the mouth of the Axe, below Uphill. — *L. binervosum* C. E. Salmon. 8. Mud-flat near the mouth of the Brue (left bank), below Highbridge; only one plant was noticed. Some years ago Mr. Thompson found it on the right bank; but it now seems to have disappeared.

Lysimachia vulgaris L. 3. Near Bridgwater, *H. S. Thompson.* — *L. Nummularia* L. 3. By ditches between Maunsel and Athelney.

Anagallis arvensis L. 3. The var. *carnea* (Schrank) has been observed at Orchard Portman by Mr. Corder.

Myosotis repens G. & D. Don. 3. W. Monkton; very local.

Lithospermum officinale L. 8. Quarry near Wells, *H. S. Thompson.*

Hyoscyamus niger L. 8. Burnham, *H. S. Thompson.*

Verbascum Blattaria L. 8. Garden-wall, Ashcott; "known for twenty years," *H. S. Thompson.*

Linaria spuria Mill. 8. Street, *H. S. Thompson.*

Mimulus moschatus L. 2, 3. Established by a streamlet near Crowcombe, *A. Lyons.* In a letter Mr. Lyons mentions that it grows two or three feet high, which seems to point rather to

M. Langsdorffii; but I understand that a specimen was seen and named by Mrs. Gregory.

Veronica Anagallis-aquatica L. 3. Near N. Newton.

Euphrasia curta Wettst. var. *glabrescens* Wettst. 9. Near Cheddar.

Utricularia vulgaris L. *3. Abundant in ditches between Maunsel and Athelney. Probably owing to the long drought all the flowers were deformed, but the capsules appeared to be perfect. There is a note in Murray's copy that the record of *U. intermedia* from 9. Weston-in-Gordano (Journ. Bot. 1901, 92) was an error.

Verbena officinalis L. 5. Chedzoy, *H. S. Thompson.*

Nepeta Cataria L. 8. Between Knowle and Dunball, *H. S. Thompson.*

Marrubium vulgare L. 9. Compton Bishop, *H. S. Thompson.*

Lamium amplexicaule L. 3. Near Bridgwater, *H. S. Thompson.* —*L. Galeobdolon* Crantz. 2. Bossington.

Plantago maritima L., *P. Coronopus* L. 5. Banks of the Parret (about Bridgwater), *H. S. Thompson.*

Littorella uniflora Asch. 2. Dry pools, Danesborough, 1898, *H. Corder.*

Salicornia procumbens Sm. *2. Near the harbour, Minehead.

Polygonum lapathifolium L. 3. Abundant in cultivated land between Maunsel and Athelney. — *P. Bistorta* L. 3. Meadow between Bishop's Lydeard and Crowcombe Heathfield.

Rumex maritimus L. 3. Several fine plants grew on dredged mud by the towing-path of the Bridgwater Canal, near N. Newton. Not given for v.-c. 5 in Top. Bot., but reported long ago by Collins from near the mouth of the Parret; it may occur thereabouts in the ditches. — *R. pulcher* L. 9. I found this in a very unusual station, *viz.* the top of a limestone down, not far from Purn Hill, Bleadon; as a rule it is quite a low ground species.

Mercuralis annua L. 3. Bridgwater; and 8. near Glastonbury, *H. S. Thompson.*

Parietaria ramiflora Moench. 4. Montacute, *H. S. Thompson.*

Carpinus Betulus L. 3. Near Bridgwater, rarely; and 9. Brockley Combe, *H. S. Thompson.*

Hydrocharis Morsus-ranæ L. 9. Yatton; Puxton.

Orchis latifolia L. 8. Near Burnham.

Luzula Forsteri DC. 3. N. Petherton.

Typha angustifolia L. 8. Rhine, between Cheddar and Yatton, *Miss Mules.*

Lemna gibba L. 3. Ditches between Maunsel and Athelney; *Alisma ranunculoides* L. also occurs in some plenty.

Potamogeton Friesii Rupr. *3. Canal near Bridgwater ("probably this"), *H. S. Thompson.*

Zannichellia palustris L. 2. Kilve, *H. S. Thompson.* 3. Pond at Hyde, Bathpool.

Eleocharis acicularis R. & S. *3. Plentiful in the canal, near N. Newton; I only discovered it owing to the lowering of the water, caused by a lock being opened.

Schœnus nigricans L. 9. Near Winscombe, 1900, *W. F. Miller*; a second station for Somerset.

Carex pendula L. 2. Kilve; between Combwich and Stoke Courcy.—*C. riparia* Curt. 8. Loxton.

**Agrostis nigra* With. 2. Roadsides near Watchet; and 3. Bridgwater, *H. S. Thompson.* New, I believe, for Somerset.

Deschampsia setacea Richter. Though not unlikely to be found on the western moors, this species was recorded by me last year in error from between E. Anstey and Brushford. The plant referred to it was quite past flower, and greatly resembled it in foliage. Mr. Arthur Bennett has pointed out that the inflorescence is that of an *Agrostis*, and considers it to be a variety of *A. tenuis* Sibth. (*vulgaris* With.), a grass usually found in dry ground, whereas this was in wet bogs, associated with *Eriophorum*, *Pinguicula*, &c. It deserves further study at the flowering season, and may possibly prove to be the var. *capillaris* (Leers).

Glyceria declinata Bréb. 3. W. Monkton; very local.—*G. aquatica* Wahlb. 3. About Maunsel and Athelney.—*G. maritima* Mert. & Koch. 9. Uphill.

Festuca bromoides L. (*sciuroides* Roth). 2. Dodington, *H. Corder.*—*F. pratensis* Huds. 9. Uphill.

Bromus secalinus L. 5. Waste ground, Bridgwater, *H. S. Thompson.*

Nardus stricta L. 2. Will's Neck, *H. S. Thompson.*

Elymus arenarius L. 9. In sand, between the Weston Esplanade and Brean Down, 1898, *Miss Mules* (note in Murray's copy). It seems to have disappeared, perhaps only for a time.

Blechnum Spicant With. 2, 3. Holford, *H S. Thompson.*

Asplenium marinum L. 2. Near Minehead.

Polystichum angulare Presl. 3. Broomfield.

Chara fragilis Desv. 3. Ditches on Northmoor, near Maunsel, in profusion. 8. Shapwick, *Rev. G. R. Bullock-Webster.*—*C. hispida.* 5. Near Othery, *ditto.*

**Tolypella glomerata* Leonh. 5. Canon Bullock-Webster discovered this interesting addition to the flora of Somerset sparingly in a ditch on King's Sedgemoor, near Othery, May, 1899.

"AMATEUR NOMENCLATURE."

By Alfred J. Ewart, D.Sc., F.L.S.
(Professor of Botany, University of Melbourne.)

I note in your Journal for Dec. 1908 an article on "Amateur Nomenclature" which calls for explanation and reply. As I understand it, plants are given names for the convenience of those interested in them, whether from a scientific or utilitarian aspect, under which latter head a large non-botanical section of the general public is included. From their point of view twenty-five years' undisputed use should be sufficient to make a name valid, provided it represented a good species and did not flagrantly violate

the rules. In the absence of such a time limit, however, we must allow our application of the law of priority to be governed by common sense and public convenience. It has, for instance, recently been proposed on priority grounds to change the name *Pimelea* to *Banksia*, and that of *Banksia* to *Isostylis*. The name *Banksia* especially is so common and well known, and is so frequent in Australian literature, that it would cause hopeless confusion to make the suggested alteration; and it should be borne in mind that such changes place unnecessary difficulties in the way of those who are endeavouring to popularize botanical study in Australia.

Among several charges, accusations of error (including printer's errors which were corrected in the next number), the most serious is what the Editor makes out to be one of altering the name of a plant I knew nothing about, and referring it to Baron von Muller eleven years after his death. I enclose a specimen of the plant in question, and am glad to inform the Editor that the type also is now at the National Herbarium [Melbourne]. In regard to the change of name, that of *Tysonia* being attached to another plant no other course was open but to alter it, and as I regarded this as being of the nature of a proof correction, the initials F. v. M. were retained, instead of using my own. This may be illogical, but it is at least an honest attempt to give credit where credit is due. It is idle to pretend that the author's initials after a name are placed there solely for reference purposes. No such practice is found necessary in geography, geology, anatomy, or astronomy; and for purposes of reference the place and date of publication would be the only sensible ones to give. This would not be at all cumbersome if all the journals recognized for the publication of new species were numbered, and were this done and the practice of appending the author's name to a species discontinued, there would be less temptation to unnecessary changes of name, and the priority rule could with advantage be restricted to a period of twenty-five years, or about the average working lifetime of a scientist. After that period public convenience should be considered as of prior importance, and no changes authorized except for the most weighty reasons.

Finally, the Editor quotes two cases of error, including the recognition of a "provisional" species in the *Victorian Naturalist*, xxiii. 1906, p. 43. I frankly admit them to be such, but they were subsequently corrected (*ibid.* vol. xxiv. p. 60) and occurred in a maiden essay on systematic work. Apart from such details two facts stand out clearly: (1) Botanical nomenclature is not in a satisfactory condition. (2) The strict application of the law of priority leads to numerous absurdities and unnecessary changes.

[We print Prof. Ewart's note, but it will be observed that it touches very few of the points raised in the article on this "Amateur Nomenclature" (Journ. Bot. 1908, 376-380), and we do not think his proposed method of citation is likely to meet with acceptance. The retention of *Pimelea* Banks & Sol. for *Banksia* Forst. is in accordance with the list of "nomina conser-

vanda" appended to the Vienna Rules: *Banksia* Gaertn., therefore, stands for the genus with which it is generally associated.—Ed. Journ. Bot.]

SOME NEW JAMAICA ORCHIDS.—III.

By W. Fawcett, B.Sc., F.L.S., & A. B. Rendle, D.Sc., F.R.S.

(Continued from p. 129.)

Habenaria socialis. Type in Herb. Kew. Herba glabra. Caulis erectus, foliatus, vaginis foliorum tectus. Folia lanceolata, tenuia, 9-nervia, acuta, superne minora atque bracteiformia, basi amplexicaulia et in vaginam tubulosam angustata. Bracteæ lanceolatæ, acuminatæ, ovario pedicellato subæquilongæ. Racemus sublaxus, multiflorus. Flores erecti. Sepala, medianum enerve, suborbiculare, obtusissimum, apiculatum, cucullatum; lateralia 2-nervia, oblonga, retusa. Petala indivisa, reticulato-2-nervia, oblonga, basim versus antice lobo prominenti instructa apice emarginato, nervibus excurrentibus mucronata. Labellum simplex, lineari-ligulatum, basim angustum versus utrinque lobo prominenti instructum, margine revoluto; calcare tenui, compresso, apicem versus angustato, ovario subæquilongo; processubus stigmaticis brevissimis, capitatis, glandulosis; antheræ canalibus ascendentibus, processubus duplo longioribus.

Plant 3 dm. l. Stem about 2 dm. l., 3 mm. br. Leaves, blade to 8·5 cm. l., to 2 cm. br. Bracts, lower 1·3 cm. l. Pedicel about 3 mm. l. Ovary about 1 cm. l. Raceme about 10 cm. l. Flowers green. Sepals, median about 3·5 mm. l. and br.; lateral about 4·3 mm. l., about 2 mm. br. Petals 3·5 mm. l., about 1 mm. br. Lip about 5·5 mm. l., about 1·2 mm. br. Spur about 1 cm. l.

Hab.—Growing with *H. alata* Hook. in marshy soil, near Mandeville, *Purdie*!

Differs from *H. alata* Hook. in the texture and venation of the leaves, in the flowers being about half the size, in the form of the sepals and petals, and in the relatively longer lip. Differs from *H. quadrata* Lindl. in form of petals, length of spur, and other details.

Habenaria Purdiei. Type in Herb. Kew. Herba glabra. Caulis erectus, foliatus, vaginis foliorum tectus. Folia lanceolata, tenuia, insigniter reticulato-11–15-nervia, acuta, superne minora atque bracteiformia, basi amplexicaulia et in vaginam tubulosam angustata. Bracteæ lanceolatæ, acuminatæ, ovario pedicellato breviores. Racemus sublaxus, multiflorus, ambitu oblongus. Flores patuli. Sepala reticulato-3-nervia, venis extus prominentibus; medianum suborbiculare, cucullatum, obtusissimum, margine minute denticulato; lateralia ovali-falcata, concava, obtusa. Petala indivisa, oblonga, obtusissima, 2-nervia. Labellum lineari-ligulatum, pendulum margine revoluto, basim versus utrinque dente parvo instructum, sepalis dimidio longius; calcare tenui, compresso, apicem versus angustato, ovario subduplo longiore; pro-

cessubus stigmaticis apice crassis; antheræ canalibus subduplo longioribus, ascendentibus; anthera acute cristata (in spec. exam.).

Plant 4·5 dm. l. Stem about 3 dm. l., 3·5 mm. br. Leaves, blade to 8 cm. l., to 1·9 cm. br. Bracts, lower 1·7 cm. l. Pedicel about 5 mm. l. Ovary 1–1·8 cm. l. Raceme about 12 cm. l. Sepals, median 8·5 mm. l., 7·7 mm. br., lateral about 11 mm. l., about 5 mm. br. Petals 6 mm. l., 2 mm. br. Lip 13 mm. l., nearly 2 mm. br. Spur barely 3 cm. l. Stigmatic processes about 2 mm. l.; anther-canals about 3·3 mm. l.

Hab.—Hollis's Savanna, Clarendon, *Purdie*!

Differs from *H. obtusa* Lindl., from Brazil and Surinam, in the smaller lanceolate bracts, and in other details.

Habenaria troyana. Caulis subrobustus, foliatus. Folia lanceolata, acuta, amplexicaulia, vaginantia, superne bracteiformia. Racemus elongatus, densus. Bracteæ ovato-lanceolatæ, subacuminatæ, foliis superioribus conformes. Pedicelli breves. Sepala reticulato-nervosa; medianum ovato-suborbiculare, obtusissimum, cucullatum; lateralia semi-ovata, obtusa, patentia, mediano longiora. Petala integra, oblonga, retusa, basi obliqua, basim versus quam apice latiuscula et antice lobo obsoleto instructa. Labellum simplex, lineari-ligulatum, basi angulatum; calcare pendulo, leviter curvato, a basi tenui superne robustiore, quam ovarium pedicellatum breviori; processubus stigmaticis brevibus, compressis; antheræ canalibus subæqualibus, leviter curvatis.

Plant 6 dm. l. Leaves about 10 cm. l., about 2·5 cm. br. Raceme 3 dm. l. Bracts 3·5–1·2 cm. l., 1·3–·6 cm. br. Sepals, median 6 mm. l., 5 mm. br., lateral 7 mm. l., 3·5 mm. br. Petals 5 mm. l., 2·3 mm. br. Lip 8 mm. l., 1·75 mm. br. near apex, rather over 2 mm. br. near base. Spur 9 mm. l.

Hab.—In damp shady forest; in flower, Nov.; near Troy, 2500 ft., 10,432, *Harris*!

Differs from *H. Sanbornii* Ames in the smaller, narrower, less membranous leaves, and the larger flowers with clavate, not filiform, spur. *H. Sanbornii* is a larger, coarser-growing plant. Very near *H. eustachya* Reichenb. f. in Ber. Deutsch. Bot. Ges. iii. 274 (1885), from Porto Rico (Sintenis, no. 511*b*), which, however, has the median sepal elliptical and obtusely acute. We have not seen this number of *H. eustachya*, and possibly *H. Sanbornii* may prove to be the same species.

Physurus jamaicensis. Herba glabra, 8-pollicaris. Caulis foliatus. Folia lanceolata, acuta, petiolata; folium supremum nanum. Vaginæ 1–2, scariosæ. Spica multiflora, cylindrica. Bracteæ ovato-triangulares, acuminatæ, 1-nerviæ, ovarii longitudine. Flores patentes. Ovarium tenue. Sepala maculosa, 1-nervia; medianum lanceolatum, obtusum, margine medium supra undulato, concavum; lateralia oblongo-elliptica, obtusa, leviter falcata. Petala maculosa, 1-nervia, lineari-lanceolata, margine undulato. Labellum 3-nerve, medium infra constrictum; parte superiore ambitu late rotundata, 3-lobata, lobis lateralibus subsemicircularibus, lobo mediano subulato; parte inferiore subovata,

valde concava, basi subcordata. Calcar rotundato-ellipticum, ovario dimidio brevius.

Plant about 2 dm. high. Stem about 1·5 dm. l. Leaves, blade 3·5–5 cm. l., 1·1–1·6 cm. br.; stalk with sheath 7–17 mm. l.; blade of the highest leaf 1·2–1·7 cm. l. Spike about 4 cm. l. Bracts 6–4 mm. l. Sepals, median 3·2 mm. l., 1 mm. br., lateral 3·4 mm. l., 1–1·1 mm. br. Petals 3·1 mm. l., ·75 mm. br. Lip, upper part about 1·4 mm. l., 1·6 mm. br.; middle lobe ·75 mm. l.; lower part about 1 mm. l. Spur 1·6–1·8 mm. l., 1–1·3 mm. br.

Hab.—In shady woods; in flower, Oct.; Olive River, near Christiana, 3000 ft., 10,472, *Harris*!

Differs from *P. hirtellus* Lindl. in the leafy, glabrous stem and in the lip.

Cranichis pilosa. Caulis inferne glaber, superne glanduloso-pubescens. Folia pauca (1–2), radicalia, longe petiolata, rotundato-ovata vel rotundata, subcordata, acuta; petioli planiusculi, basi vaginantes. Vaginæ paucæ (1–2) scariosæ, infra folia oriundæ; caulinæ plures (5–9) laxæ, ellipticæ, breviter acuminatæ, basi tubuliformes. Spica densa, glanduloso-pubescens. Flores, pauci vel multi, parvi, patuli, sessiles. Bracteæ ovario æquilongæ vel breviores, ovatæ, acuminatæ, glabræ, 3-nerviæ, nervis lateralibus brevibus. Ovarium fusiforme, infra medium latissimum, glabrum. Sepala 3-nervia, ovalia, brevissime acuminata. Petala linearia, acuta, 1-nervia, marginibus pilosis. Labellum breviter lateque unguiculatum, late ovatum, valide 3-nerve, nervis lateralibus cum ramulis extrorsis descendentibus, cymbiforme, apice angusto, triangulari. Columna postice basi alata, alis inferne latioribus, lateribus autem basi alis parvis instructa; rostellum elongatum capitatum; stigma rotundatum. Anthera brevissime pedicellata. Capsula (immatura) fusiformis.

Plant 10–25 cm. high. Stem 8–22 cm. l. Leaves, blade 4–10 cm. l., 2·5–7·5 cm. br.; petioles 1·5–3 cm. l. Sheaths 3·1 cm. l. Spike 1–2 cm. l. Bracts 4–7 mm. l. Ovary 6–7 mm. l. Sepals, median 3·5–4 mm. l., 1·5–2 mm. br.; lateral 3·2–3·5 mm. l., 1·5–2 mm. br. Petals 3 mm. l., ·6 mm. br. Lip 2·6–2·8 mm. l., 2 mm. br. Column 1·5 mm. l. Capsule (not ripe) about 1 cm. l.

Hab.—In damp shady places; in flower, Nov., April; Morse's Gap, 5000 ft., 7749; Vinegar Hill, Portland, 3000 ft.; Cascade, 3000 ft.; near John Crow Peak, 5800 ft.; between Cinchona and Morse's Gap, 4900 ft., 10,503; *Harris*!

Distinguished from the other Jamaican species by its linear, pilose petals, and broadly ovate leaves.

HARRISELLA (gen. nov.). Herba epiphytica acaulis atque aphylla, radicibus fasciculatis. Flores minuti, distichi, in racemis laxis paucifloris radicalibus, ad pedicellum brevem supra crassiorem articulati. Bracteæ parvæ, persistentes. Sepala libera, subæqualia, erecta, apice patentia. Petala sepalis similia et æquilonga, sed angustiora. Labellum sepalis vix longius, ad basim columnæ sessile, in calcar globosum basi valde constrictum productum; lamina fere globosa columnam amplectens atque cucullata.

Columna brevissima, apoda. Anthera terminalis, opercularis, incumbens, planiuscula, indistincte 2-locularis; pollinia 2, globosa, cerea, stipitibus 2 brevibus filiformibus. Capsula parva, breviter ellipsoidea, apice valvulis sex invicem latis angustisque dehiscens.

Species, only one known, native of Jamaica, Cuba, and Florida.

The genus is very near to *Campylocentrum*, in which it was formerly included, but it differs in the inflorescence, the lip, in the form of the anther, and the form and dehiscence of the capsule.

It is dedicated to Mr. William Harris, F.L.S., Superintendent of Public Gardens, Jamaica, and an indefatigable collector, who has added much to our knowledge of the Jamaican flora.

H. porrecta. *Aëranthus porrectus* Reichenb. f. in Flora, xlviii. 279 (1865); Griseb. Cat. Pl. Cub. 265. *Campylocentrum porrectum* Rolfe in Orchid Rev. ii. 247 (1903); Ames, Orchid. i. 15, t. 4. Radices gracillimæ, flexuosæ, albæ, canescentes, simplices. Racemi, plurimi-fasciculati. Bracteæ ochreatæ, obtusæ. Pedicelli bracteas vix excedentes, sub ovario incrassati. Ovarium infra tenuiore, in lineis sex verticalibus glandulosum. Sepala reticulato-nervulosa, carinulata; dorsale ovali-ellipticum, obtusum; lateralia ovalia, obliqua, acuta. Petala linearia, obtusa, apiculata, 1-nervia. Labellum obtuse apiculatum. Columna teres; androclinium, antice 2-lobatum; anthera subdeltoidea.

Roots to 1 dm. l., ·5 mm. br. Racemes 4–5 cm. l. Bracts 1·3 mm. l. Ovary 2·7 mm. l. Sepals a little over 2 mm. l.; dorsal ·8 mm. br., lateral 1 mm. br. Petals a little over 2 mm. l., ·7 mm. br. Lip 2·5 mm. l. Spur ·7 mm. Capsule 6 mm. l., 5 mm. br.

Hab.—On trees; in flower and fruit in Nov.; above Hope Mines, 7762, *Harris*!

Distribution.—Cuba, Florida, Yucatan.

Dendrophylax Barrettiæ. Herba parva, acaulis. Radices gracillimi, flexuosi, simplices. Scapi plures, aggregati, simplices. Bracteæ paucæ (3), ochreatæ, ore ovato, apiculato. Flores parvi, solitarii. Sepala triangulari-lanceolata; lateralia patentia, mentum formantia. Petala erecta, sepalis æquilonga, lineari-ligulata. Labellum indivisum, saccatum, superne late ovatum, acuminatum, columnam amplectens. Calcar suberectum, sepalis quintuplo longius, apice subclavatum. Pollinia stipitibus simplicibus.

Plant about an inch high. Roots to 12 cm. l. Scape to 2·5 cm. l. Bracts 1·5 mm. l. Flowers greenish-white, spur rather lighter in colour. Sepals and petals 4 mm. l., spur about 2 cm. l.

Hab.—On trees; in flower, Aug.; near Brown's Town, *Miss T. M. Barrett*! Holly Mount, Mt. Diabolo, 2600 ft., *Harris*!

(To be continued.)

SHETLAND PLANTS.

By W. H. Beeby, F.L.S.

[The following remarks are extracted by permission from Mr. Beeby's interesting paper on the Flora of Shetland published in the *Annals of Scottish Natural History* for April last, pp. 103–7. —Ed. Journ. Bot.]

Forms of Montia fontana.

Montia lamprosperma, Cham. [in *Linnæa* vi. 564, 1831] Syn. *M. rivularis* auct. nonnull. (non Gmelin).—This is a new name, rather than a "new British plant," as it has been called. In his last article in the *Botany of the Færöes* (iii. 853) Dr. Ostenfeld, following Dr. Harald Lindberg, adopts the above name in place of *M. rivularis*, on the sufficient ground that Gmelin did not describe the seeds. In consequence of this omission, we find that *M. rivularis* is variously placed by different authors. On proceeding to examine my material, both British and foreign, I found that the separation of *M. fontana* into two forms was not quite the simple matter that I had supposed it to be; for we have, in Britain, three distinct forms of seed which may be characterised as follows:—

1. Seeds entirely covered with large coarse tubercles, and quite without reticulations; black, dull or slightly shining.
2. Seeds covered on their face with rather coarse reticulations, but with about three rows of much smaller and more conical tubercles on each side of the keel, which is also minutely tuberculate; black and perhaps rather more shining.
3. Seeds entirely covered with fine reticulations which are a good deal longer and narrower than those of form 2; black, or more usually dark brown or purplish brown, polished, and quite without tubercles.

I propose the following arrangement of these forms; the counties named are those whence I have specimens, and must not be taken to represent their distribution or comparative rarity.

Montia fontana, L.

ssp. *minor*, Gmelin [Fl. Bad. i. 301, 1805, as species.]

var. *a. chondrosperma*, Fenzl ap. Ledeb. [Fl. Ross. ii. 152, 1844] (syn. *M. fontana*, Cham. in Linnæa [vi. 565], 1831, pl. 7, fig. 1; *M. fontana*, var. *minor*, *Syme*). Seed form No. 1.—Surrey.

b. intermedia, Beeby, ined. (syn. *M. fontana*, var. *minor*, Bab. Man.; *M. rivularis*, Garcke?). Seed form No. 2.—Cornwall W., Surrey.

ssp. *lamprosperma*, Chamisso, *l.c.* pl. 7, fig. 2 (syn. *M. fontana*, var. *major*, Bab.; *M. fontana*, var. *rivularis*, Syme). Seed form No. 3.—Shetland.

I think there is very little doubt that Syme's var. *rivularis* is the same as *M. lamprosperma*, but his description of the fine reticulations as "flattened tubercles" is perhaps hardly happy.

He describes the seeds as larger, "more inclining to claret-colour," and shining.

I take no account of the land and water states of these plants, since they are merely temporary conditions directly induced by the environment, and not varieties.

I have not seen the original description of var. *chondrosperma*, Fenzl, and for the meantime have relied on that given by Rouy and Foucaud—"Graines opaques, fortement tuberculeuse."

TARAXACUM SPECTABILE, Dahlst., ssp. GEIRHILDÆ, Beeby, ined.

Differs from the type in the leaves being always undivided, whether growing among long herbage or on bare ground. (In the type they are undivided when among herbage but deeply lobed when on bare ground.) After sixteen months' cultivation on bare ground the plants have never borne a lobed leaf, although the whole-leaved state of the type quickly assumes the bare-ground state, with lobed leaves, under similar conditions. The leaves are also of a much paler, yellower green, thus contrasting strongly with the dark, brown-red midrib. The flowers are one-fifth to one-fourth more in diameter than those of the type when grown side by side; of a darker (browner) yellow; and copiously furnished with pollen, while the type is epolliniferous. The phyllaries and fruits are similar to those of the type.

The name has indirect reference to one of the localities, the Loch of Girlsta, formerly Geirhildarstadr; here Geirhild, Hrafna Floke's daughter, was drowned when accompanying her father on his voyage to Iceland about the year 870, as we are told in Landnámabok.

The sub-species occurs plentifully on rock ledges, among heather, and in grassy places by the east side of Lang Klödi Loch, Northmaven; also among rocks and heather by the Loch of Girlsta, and elsewhere in Nesting and Weisdale.

I have always found the type to be pollenless until this year, when I found pollen-grains on the stigmas; but as the pot was standing next to that containing the ssp. *Geirhildæ*, it is possible that the pollen had been conveyed by insects.

A NEW SIPHONEOUS ALGA.

BY A. & E. S. GEPP.

SOME seven years ago we prepared a monograph of the genus *Udotea* in connection with the Reports of the "Siboga" Expedition to the Dutch East Indies, but decided to postpone its publication until we could study all the allied genera, and issue a monograph treating of the whole group of the *Udoteaceæ*. The text of this paper is practically ready for publication, but as other algologists are working at the same group of plants from the West Indies, we think it opportune to publish a preliminary diagnosis

of a new species of *Udotea* collected long since at the island of St. Thomas by the 'Challenger' Expedition, and preserved in the British Museum.

Udotea verticillosa, sp. n. Planta 4–5 cm. alta, calce incrustata; fronde supra stipitem simplicem, 1 cm. longum 1 mm. crassum, flabelliformi basi cordata, 5–6 cm. lata, glaucoviridi, haud striata, distinctius zonata, margine proliferi-lobato, pagina minutissime crustato-spiculosa vel granulosa; filis flabelli 30–50 μ in diam. parallelis haud contiguis, monostromaticis, remote dichotomis, ramulorum lateralium subsessilium vel breviter pedicellatorum furcatorum spinosorum 30–50 μ long., stratum superficiale minute coralloideum formantium, subverticillos approximatos emittentibus; filis stipitis ramulorum lateralium pedicellatorum 100–400 μ. long. profundius divisorum apicibus mammillatim acutatorum subverticillos similes emittentibus, parietibus incrassatis.

Hab. West Indies, St. Thomas, five to fifteen fathoms, 'Challenger' Expedition.

Its nearest ally is *U. argentea* Zan., which differs in having the lateral appendages of its frond-filaments capitate and more longly stalked.

THE GENUS *ROTULA*.

By Robert Hugh Bunting.

Loureiro's genus *Rotula* (Fl. Cochinch. 1790, p. 121) is referred tentatively by Bentham and Hooker (Gen. Plant. ii. 842) to *Rhabdia* Mart. (Nov. Gen. et Sp. Pl. ii. 136); in the *Index Kewensis* and by Mr. C. B. Clarke (Fl. Brit. India, iv. 145) it is cited as a synonym of *Rhabdia lycioides* Mart.

A question having arisen as to the identity of the plants described under the two names, Dr. Rendle suggested a careful comparison of Loureiro's type in the National Herbarium * with authenticated specimens of *Rhabdia lycioides*, since, if the two were proved identical, *Rotula*, being the earlier name, would take precedence. Unfortunately Loureiro's type consists only of twigs of two or less years' growth and devoid of foliage, together with a few isolated calyces and fruits and some young leaves, in a capsule. It was first compared with a specimen of *Rhabdia lycioides* from Nepal (Wallich No. 9062).

Transverse sections of the oldest branch of *Rotula* show it to have been collected in the early part of its second year's growth. The pith consists of parenchymatous cells fairly large in the centre but decreasing in size towards the xylem; there are no intercellular spaces. The xylem is chiefly composed of tracheids with a few large vessels scattered about in groups of two to five; the tracheids bordering the medullary rays are more or less rect-

* Loureiro sent in 1774 a small collection of plants to Captain Riddel, who subsequently presented it to Banks. See Journ. Bot. 1902, 389.

angular in section. The limit of annual growth is clearly defined by about three concentric rings of radially compressed tracheids. Numerous medullary rays occur but are rarely of more than one cell in width. The phloem contains much parenchyma which presents a very compressed appearance. The cortex consists of medium-sized cells which occasionally contain crystals of calcium oxalate; isolated strands of from three to thirty sclerenchymatous cells occur at varying distances near the phloem. The periderm is represented by about three layers of thin-walled rectangular cells. The stem anatomy of Wallich's specimen presents no essential differences from the above, except that its first year's xylem is but two-thirds the thickness of that in *Rotula*.

Sections of specimens collected by Mr. Scott Elliot (No. 4718) in Sierra Leone and by Gardner (No. 1793) in Brazil are precisely similar.

The young leaves of Loureiro's specimen which come from the base of an inflorescence are sessile, oblong-ovate, very slightly serrate and glabrous. The lanceolate-acuminate bracteole is ciliate along its margin and closely applied to the calyx, which consists of five lanceolate-acuminate, slightly gamosepalous segments; these are 3·5–4·5 mm. long and ciliate along their margins. In an unopened flower the style was seen to spring from the top of the pistil. The dry fruit is a globular schizocarp of four nutlets, slightly protracted at the apex and measures 2·5 mm. long by 2 mm. wide. Wallich's specimen differs in having its sepals and fruit a little larger—they measure respectively 4·5–5 mm. and 3 by 2·5 mm.—and by the leaves, bracteoles and calyx being hispid on the under surface. Scott Elliot's plant, on the other hand, is merely ciliate, as in the type of *Rotula*.

Hence the examination of the type confirms the view previously expressed by Bentham and Hooker and C. B. Clarke that Loureiro's *Rotula aquatica* is identical with *Rhabdia lycioides* Mart., and the earlier name must therefore take precedence. The synonymy is therefore:—

ROTULA AQUATICA Lour. Fl. Cochinch. 121 (1790).
Rhabdia lycioides Mart. Nov. Gen. et Sp. Pl. ii. 137, t. 195 (1826) et auctt.

SHORT NOTES.

"FOLLOWERS OF MAN" (p. 227). — Mr. Woodruffe-Peacock asks "Why quarrel with Watson's description of 'casual colonist' as applied to *Anagallis arvensis?*" I have nothing but admiration for Mr. Woodruffe-Peacock's scientific method of working out the necessary facts dealing with plant-occurrences, but it must be borne in mind that what is true of one area cannot be regarded as a law for others which are essentially different. Even some cornfield plants may be undoubted natives; of these *Scleranthus annuus* may be one—I think tillage has increased its distribution

and modified its characters. Originally, as a native species of dry cretaceous soils, it was probably biennial, but as the soil came under cultivation the plant gradually adapted itself to its new conditions, completing its life cycle in a single year, while the agricultural processes of ploughing, &c., spread it over even larger areas, and in greater abundance, than was the case before man's operations had disturbed the equilibrium of nature. Mr. Peacock says: "Naturally *A. arvensis* is an open soil desert-prairie species. In Britain it can only find the conditions it requires in cultivated crops or on marine sands. Can any such consorting species be true natives?" Recently I visited the Steep Holms. This small rocky island has never been under corn cultivation. Doubtless at one time it was connected with the long ridge of Brean Down, but now it is widely separated; the high cliffs prevent contamination with floating *débris*. Aliens can only be introduced by man; although once inhabited, it is so no longer, but the evidence of man's occupation is shown by the occurrence of *Kentranthus*, *Cheiranthus*, &c. The commonest weeds connected with man's occupation are absent or rare; I saw no *Capsella*, *Veronica*, *Papaver*, *Lamium*, *Lychnis alba*, or *Stachys*.* Yet one of the common species growing not on the side which showed the evidence of human occupation but on the southern and western and northern parts, which have been less touched by man, was *Anagallis arvensis*. Here it grew with *Sedum acre*, *Cerastium pumilum*, *Cardamine hirsuta*, *Erodium maritimum*, *Lotus corniculatus*, *Cotyledon*, *Blackstonia*, *Plantago Coronopus*, *Parietaria*, *Festuca rubra*, &c. On Aberfrau Common, too, I have seen it in abundance, growing with *A. tenella*, *Viola Curtisii*, *Centaurium* species, *Festuca rubra*, *Potentilla Anserina*, &c. In both localities I should say *A. arvensis* native, *i.e.* aboriginal or introduced, without the direct or indirect agency of man. Wind may have blown seeds of *Anagallis* to some of its maritime localities; we are apt to overlook the effects of wind in plant-distribution. At the same time, while believing *Anagallis arvensis*, *Valerianella olitoria*, and *Sherardia arvensis* to be native, I think that many others which have recently been mentioned as deserving the same rank have no shadow of justification to be so considered, since their geographical distribution renders it extremely unlikely, if not indeed impossible. — G. Claridge Druce.

—— Probably no accurate observer would nowadays claim *Chelidonium majus* as a certain British native. The standing of *Sonchus oleraceus* and *S. asper* is rather more doubtful; owing to the feathery pappus of their seeds, they can be conveyed a long way, and thus occasionally appear in stations far from their normal habitat in garden or arable ground; yet they *may* have existed here before the advent of man. Mr. Woodruffe-Peacock has, how-

[* In Journ. Bot. 1891, 269–70, the Rev. R. P. Murray recorded *Papaver dubium*, *Lychnis alba*, *Veronica arvensis*, *V. Buxbaumii*, and *Lamium amplexicaule* among the plants observed by him on the Steep Holm in that year.—Ed. Journ. Bot.]

ever, no right to *brusquer les choses* as he does with regard to *Anagallis arvensis*. It is proverbially difficult to prove a negative; and, while I admit his qualification to decide against it as regards his own county, I must protest against his assumption that the deliberate judgement of other observers, perhaps not less experienced or less careful than himself, can be brushed aside by his mere *ipse dixit*. Watson's work in this connection was, as a whole, most valuable and indeed necessary; but he would have been more convincing, in some instances, if his language had been tempered with the *suaviter in modo*; and he was not by any means infallible.—EDWARD S. MARSHALL.

BRISTOL PLANTS.—*Myosurus minimus* L. Although for many years the Mouse-tail had been specially sought for in both the vice-counties that adjoin this city, there was no result until last spring. In April, 1908, Miss Hill and Miss Peacock, in company, discovered it along the edge of a cornfield (alluvial clay) near the Bristol Channel, in the parish of Portbury, North Somerset. Last month the plant appeared again in the same field, though not in the same spot, in considerable quantity amongst the crop for about one hundred yards. A new record for vice-co. 6.—*Mœnchia erecta* Gaertn. The sole record for Gloucestershire rested hitherto on specimens gathered more than half a century ago by Drs. Thwaites and Stephens on Brandon Hill, Bristol, where the plant was then well known. But it soon afterwards disappeared, and apparently continued absent from the county until the present time. My friend Mr. Cedric Bucknall has now found a new station on Yate Common, about ten miles north of Bristol (v.-c. 34)—a pennant sandstone locality similar to that discovered in North Somerset some years ago by Mr. David Fry.—JAMES W. WHITE.

PRUNUS SPINOSA L.—I have noticed for some years a bush or rather small tree of this species in a pasture hedge here (Cadney, Lincolnshire) which seemed more thickly covered with flowers than the ordinary type. I forgot to look at it this season while it was in flower, but found on visiting it on June 11th that most of the peduncles must have been two-flowered, and in some cases even three-flowered. This can be most clearly seen from the fruit, which I enclose. I do not remember ever meeting with this form before, and have no doubt it would prove interesting to some specialist in abnormalities.—E. ADRIAN WOODRUFFE-PEACOCK.

JAMES DICK († 1775).—James Dick was included in the Third Supplement to the *Biographical Index of British Botanists* under the supposition, for which there seems no warrant, that he was of British origin. In addition to the information quoted about him (Journ. Bot. 1904, 358) and about his herbarium, which was acquired by Banks (Journ. Bot. 1902, 309), reference may be made to his letters in *Epist. ad Haller*. v. 308, 313, 314, 317, containing descriptions of plants; a list of the plants collected by him in the summer of 1766 occupies pp. 284–291. The letters are dated from Spiez on the Lake of Thun, to which place he apparently belonged.

An appreciation of Dick by Gesner is on p. 141: "Agnovi in eo hominem rei herbariæ studiosissimum et diligentissimum, atque in Botanica helvetica versatissimum."—JAMES BRITTEN.

REVIEWS.

ELEMENTARY TEXT-BOOKS.

1. *Prantl's Lehrbuch der Botanik.* Herausgegeben und neu bearbeitet von Dr. FERDINAND PAX. 13te verbesserte u. vermehrte Auflage. Large 8vo, pp. v, 498, with 462 text-figures. Leipzig: Engelmann. 1909. Price 6 marks.
2. *A First Book of Botany.* By ELIZABETH HEALEY, A.R.C.S., Assistant Lecturer in the University College of South Wales and Monmouthshire. Small 8vo, pp. viii, 142; 89 figures in text. London: Macmillans. 1909. Price 1*s.* 6*d.*
3. *Beginners' Botany.* By L. H. BAILEY. Small 8vo, pp. viii, 208; 302 text-figures. New York: The Macmillan Co. 1908. Price 3*s.* 6*d.*

1. PRANTL'S text-book of botany, issued from Wurzburg in 1874, has played as important a part in elementary botanical teaching as has the classic text-book of Sachs in advanced work. Its English form, edited and developed by Vines, has been used by nearly two generations of students, and was the origin of the larger text-book by the same author. The present, the thirteenth German edition, by Professor Pax, closely resembles his twelfth edition of 1903. There is a small increase in size, represented by twenty pages, and there are twenty-seven more text-figures. The plan of the book is the same as in the previous edition, and the textual alterations are slight. In the section on physiology, Haberlandt's work on perceptive organs in relation to the stimuli of gravity and light is noticed, and two good figures are borrowed from him; we note also some improved illustrations of the digestive glands of *Drosera* and *Drosophyllum*. In the systematic portion, Engler's system is followed. No reference is made to the recent views as to the phylogeny and grouping of the green Algæ; nor is there any mention of the Pteridosperms—a group which helps to bridge the gap between the ferns and seed-bearing plants. However, these are perhaps subjects better left for the more advanced course, and as an elementary text-book the Prantl-Pax *Lehrbuch* remains unsurpassed, and, at any rate for the price, unequalled. The figures are excellent, the text clear, and the subject-matter well-arranged.

2. Miss Healey's book comprises a series of lessons in elementary botany, planned to follow, as far as possible, a seasonal arrangement, bearing in mind the fact that the school year now usually begins in September. A study of the buttercup forms an introduction to the parts of a typical flowering plant and their functions. This is followed by chapters on fruits and their dispersal, and on seeds and their germination. Root, stem, leaf

and their work are then studied in some detail. Then follow chapters on spring flowers, protection of pollen, and a few of the more important natural orders. A chapter on some common forest trees is followed by a short account of epiphytes, parasites, &c. The text is carefully written, and this little book should prove a helpful guide to teachers of elementary classes. There are plenty of illustrations, many of them from photographs of living plants, and many borrowed (without acknowledgment) from books previously published. The author refers more than once to the so-called protective mimicry of the stinging-nettle by the dead-nettle: it would be interesting to know how far this is warranted by observation.

3. There is always a freshness and originality about Professor Bailey's books, and his present introduction to the study of plants is no exception to this rule. In the first lesson the student is set to compare two plants of the same kind, two branches of the same tree, or any two leaves, and is thus made to realize that no two plants or parts of plants are exactly alike, and that variation "is one of the most significant facts in nature." The struggle to live under the unfavourable conditions to which every plant and animal is exposed, and the resulting death or adaptation to the environment, is the theme of the next chapter, and this leads us to the "survival of the fit." Adaptation to very different environments introduces the subject of plant-societies. The plant-body and its various parts are then studied in some detail, the facts being everywhere worked out from specimens, and questions of function and relation to environment raised in relation to structure and arrangement. The author seems to appreciate difficulties—for instance, the average text-book tells us how stems grow in length, but the fact of the permanent length of a woody stem is often left to be inferred. Prof. Bailey states plainly that when a part once becomes fixed or hard it never increases in length; "that is, *the trunk or woody parts never grow longer or higher; branches do not become farther apart or higher from the ground*"—a fact which comes very much as a surprise to the "man in the street," and is not always appreciated by students of botany. The life of the plant is frequently insisted upon, "stems and roots are living, and they should not be wounded or mutilated unnecessarily. Horses should never be hitched to trees. Supervision should be exercised over persons who run telephone, telegraph, and electric light wires, to see that they do not mutilate trees" (with a picture of an elm-tree killed by a current from an electric railroad system). Excellent advice and very necessary. The text deals mainly with the seed-bearing plants, but a final chapter gives directions for studying a few typical cryptogams. The numerous illustrations are helpful, though sometimes crude and rather sketchy. The book forms a useful and suggestive guide for teachers of elementary botanical classes.

The two little books sent by Messrs. Macmillan raise the question as to why a book sent for review should be defaced by a stamp—in the case of some publishers a very unsightly stamp—

on the title-page. The reviewer is surely entitled to a clean copy of a book which, at any rate in some cases, costs several hours' work to notice adequately.

A. B. R.

ELIZA BRIGHTWEN.

Eliza Brightwen: the Life and Thoughts of a Naturalist. Edited by W. H. Chesson. With Introduction and Epilogue by Edmund Gosse. Two portraits. 8vo cloth, pp. xxxii, 215. Price 5*s.* net. Unwin.

Those who have delighted in Mrs. Brightwen's books, and still more those who had the privilege of her personal acquaintance, will welcome this volume—all the more because it is mainly autobiographical. Of her life before her marriage the account is in narrative form, succeeded by extracts from her journal for 1855–1872, which are continued after an interval of twenty years—ten of them a period of suffering—under the heading "Thoughts," during 1892–1895. To these Mr. Edmund Gosse, her nephew, contributes an appreciative introduction, in which he supplements the autobiography by some account of Mrs. Brightwen's later years, and of the ill-health which rendered even more remarkable than it would otherwise have been her persistent observation of the various natural objects by which she was surrounded.

It was during these later years that I became acquainted with her. She was a vice-president (and original member) of the Selborne Society, and a contributor to its organ, *Nature Notes*, and the result of correspondence while I was editing that periodical was a visit to The Grove, as her place at Stanmore was called—a visit repeated each year and one of the pleasantest of annual occurrences. The Grove, with its feathered and floral inhabitants, figures so largely in Mrs. Brightwen's writings that it needs no description. The estate—not large, but embracing woodland, field, and water, as well as garden—afforded ample opportunities for observation, and of these opportunities Mrs. Brightwen fully availed herself. A walk with her round the garden was a delightful experience. It contained nothing particularly rare or remarkable—it was not a place for show, but for enjoyment, and to Mrs. Brightwen this consisted in the knowledge not only of the plants themselves but in the associations connected with them. This was brought back by her coachman when he had been away for a holiday—Mrs. Brightwen's relations with her servants, long in her service, were pleasant to see: that had been sent her from America; here was something which she had raised from seed; another had formed the text for one of her botanical papers; and so on. The beautiful lawn which extended at the back of the house was but slightly broken by beds; its chief ornament was a magnificent tulip-tree. It was surrounded by shrubberies containing seats, and here Mrs. Brightwen would sit for hours, observing the birds and other creatures which came out, undisturbed by her presence. She seemed to have a special power over living creatures; I remember one afternoon, when, obeying her instructions, I sat motionless

while she uttered a call which was promptly responded to by a young robin, who cautiously approached us and finally took his seat on her shoulder. At breakfast squirrels would come boldly in at the open window and hie to a cupboard for the nuts they knew they would find there. The history of her whitethroat "Fairy" has been told in more than one of her books, to which reference must be made for an account of the many strange and interesting creatures which she brought round her at The Grove. A large part of her garden was set apart for the growing on a large scale of stocks, sweet peas, lavender, roses, pinks, and other fragrant flowers; of these numerous bunches were sent up twice weekly to some of the London hospitals, or given to the various parties of poor folk from London missions who were invited down to spend a summer afternoon. On such occasions Mrs. Brightwen, having attended to their creature comforts, would give a simple address on spiritual subjects; for an intense religious conviction was a potent factor in her life—never obtruded but always present. A member of the Evangelical party in the Church of England, she was entirely devoid of narrowness, and, as her diaries and her books show, had a keen sense of humour, in which religious folk are often somewhat deficient. This lent brightness to her conversation, which was always attractive, for she was an excellent talker—keenly interested in her hobbies, but never boring her listeners with details concerning them.

The traits which characterized Mrs. Brightwen's later life are manifest in the early records which this volume presents to us. Her account of a captive stickleback—a memory of her thirteenth year—and of her baby donkey might have appeared in *Wild Nature*, published when she was sixty; and the "stores of knowledge" which she describes herself as acquiring from the many thousand volumes of her uncle's library—"sitting on the top of the library-steps, absorbed in the life-history of some beetle or spider, and planning fresh expeditions to secure creatures I read about but had never seen"—laid the foundation for her future work. Her desire to be helpful, her sense of fun, her keen observation, her power of description, are manifest throughout; as is the direct simple style to which her books in great measure owed their charm.

I have referred to Mr. Gosse's sympathetic and graphic introduction, which goes far towards familiarizing with Mrs. Brightwen's personality those who knew her only through her writings. But, in addition to that writer's own appreciation, it contains an excellent summary by her gardener, Mr. John W. Odell, himself a capable observer, of her acquirements in the various branches of natural history and especially of botany. "The experiments described in her *Glimpses into Plant Life* were nearly all performed and verified before being given to her readers, and as her assistant in this work I have a lively recollection of the thoroughness and accuracy that was demanded before the work was passed. More particularly do I remember the work on pollination; the patience and care bestowed

on the visits of insects to some of the flowers described was wonderful. So, too, do I remember the good humour and fun she would exhibit when some lumbering bumble-bee would fail to do as he was wanted. And there was the secret of Mrs. Brightwen's success as a naturalist, for with all her intense interest in Nature she always saw the humorous side of things, and never failed to get, if not information, some fun out of the work in hand."

JAMES BRITTEN.

Botany of the Færöes, based upon Danish Investigations. Part iii. 8vo, pp. 683, xxviii. 12 plates, 51 figures in text. Copenhagen, Gyldendalske Boghandel; London, Wheldon. 1908.

WITH this third instalment the important work on the Botany of the Færöes which Prof. Warming has edited and which represents the investigations of numerous botanists, is brought to a conclusion. As we said when noticing part ii. (Journ. Bot. 1903, 412) the volume is of special interest to British botanists on account of the close relationship of the flora to that of Britain; and it appeals to them more especially in that it is written in English.

The bulk of the present part consists of two papers—that by Dr. Börgesen (pp. 683-834) on the algæ-vegetation of the coasts and that by Dr. Ostenfeld (pp. 867–1026) on the land-vegetation. The former appeared in Danish in 1904 and in English in 1905; an appendix to the part, by Dr. Börgesen and Mag. Helgi Jonsson (of Iceland), treats of the distribution of the marine algæ of the Arctic Sea and of the northernmost part of the Atlantic. Dr. Börgesen's paper is an admirable and exhaustive piece of work; the comparison of the marine algæ-flora with that of Scotland, including the Orkneys and the Shetland islands (pp. 784–788) shows "that the Færöese algæ-flora must be regarded as a rather poor selection of the algæ of Scotland and adjacent islands, as almost all the Færöese algæ are found on the coasts of Scotland, whereas Scotland has on the other hand a very great number of species which are wanting at the Færöes; the greatest resemblance is between the Færöese algæ-flora and that of the Shetland Isles." A more thorough knowledge of the marine algæ of Shetland is however to be desired.

Dr. Ostenfeld's paper is an important contribution to ecology, based upon careful investigation during various visits, with notes from other botanists who have visited the islands at seasons of the year when he himself was absent. Beginning with a review of the published literature bearing on the subject, the author proceeds to discuss the influence of external factors on the vegetation —"the character and features of the vegetation outside the enclosures in the lower zones are in a high degree due to the grazing of sheep"—the biological features and the plant-formations: numerous illustrations add to the usefulness and attractiveness of this part of the work. Dr. Ostenfeld's additions and corrections to the list of phanerogams and pteridophyta published

in the first part contain much that is of interest. Dr. Dahlstedt describes new forms of *Taraxacum*, including a new species, *T. nævosum*. There are nearly three pages of notes upon *Euphrasia*; several "species," including *E. scotica* Wettst., *E. paludosa* Towns., *E. latifolia* Ostenf., *E. gracilis* Ostenf., and *E. arctica* Lange are all referred to *E. minima*—a conclusion supported by Mr. Beeby in the paper to which reference is made on p. 267. Under *C. officinalis* he says: "I do not doubt that many forms will be segregated in future, and I think English and Scottish botanists are on the right way when separating *C. alpina* H. C. Watson, *C. micacea* Marshall, and *C. grœnlandica* 'L.' from the common *C. officinalis* L." Dr. Ostenfeld has "compared authentic specimens of *C. micacea* Marshall with Færöese specimens grown in bare gravelly places in the hills and found them quite like." The *Ranunculus* formerly figured and described as a form (*speciosa*) of *R. Flammula* Dr. Ostenfeld now says resembles in many respects *R. scoticus* Marshall, but differs in the more numerous, larger and broader petals; these differences, however, are not very obvious in the figure. *R. reptans* he would "now prefer to take as a distinct species and not as a form of *R. Flammula*."

There is one serious drawback to the usefulness of this in every other respect admirable work, and that is the absence of anything in the way of an index. There is not even, as sometimes happens in books similarly deficient, an adequate table of contents, and, as we pointed out in a previous notice, the headings to the pages are blank save for the number, so that every means of rendering the contents easily consultable has been neglected. It is difficult to understand how a feature so absolutely necessary to the convenient use of the book should have been entirely overlooked, but we find no indication that the defect will be remedied, or that an index is in preparation. It is not, however, too late to supplement the work by supplying a detail which is essential to its usefulness.

A Survey and Record of Woolwich and West Kent. Containing descriptions and records, brought up-to-date [sic], *of the Geology, Botany, Zoology, Archæology and Industries of the district, with a brief Photographic Commentary, in commemoration of the 12th Annual Congress, 1907, of the South-Eastern Union of Scientific Societies.* General Editors: C. H. Grinling, T. A. Ingram, M.A., LL.D., B. C. Polkinghorne, B.Sc., F.C.S. (the late). 8vo cl., pp. viii, 526. Price 10*s.* 6*d.* Woolwich: Labour Representation Printing Company.

The botany of this comprehensive and well-printed work, with which alone we are concerned, occupies pp. 31–230, and is headed "The Flora of Woolwich and West Kent (Districts 1 and 2 of Hanbury & Marshall's Flora"); it is edited by Messrs. J. F. Bevis & W. H. Griffin, but these gentlemen (p. 229) transfer the responsibility to Mr. C. H. Grinling, "who has with great care and

acumen reviewed [*sic*] the whole work from its inception to the last proof."

The arrangement for phanerogams is said to be that of Engler's *Syllabus*, which, however, begins with the Monocotyledons, whereas in this the Dicotyledons take precedence, beginning with *Salix*. It is not easy to understand the principle on which miscellaneous information is given or withheld; thus of *Salicaceæ* we read: "D. [we find no explanation of this] Trees and Shrubs: diœcious" and of *Salix* "Insect-pollinated catkins containing abundant honey," but for most of the orders and genera no information is given. This is not to be regretted, as it is surely not required in a local non-descriptive list; but if given in one case, why not in another? Each name is preceded by the number in the *London Catalogue*, a useless addition, it seems to us, especially as ed. 9 is followed and in the current edition the numbers are different. Still keeping to the first page, we find that aliens are included in the same type as indigenous species; if the introductions and extinctions were omitted the list would be reduced to more than half its bulk. The locality for *S. pentandra* ("alien") is preceded by "a"; this occurs all through the book, but we find no explanation of it among the "Abbreviations and Contributors"—a curious heading—and its meaning is not to us "obvious."

As already indicated, we find it impossible to understand the scope of the book. Thus, opening at random at p. 98, we begin with *Hippophæ* (misspelt *Hippophæ*) *rhamnoides*, which we are told "is a maritime plant found in Kent, but not in our district." Then why insert it? The next is *Peplis portula*—"capital letters are not used in the spelling of specific names" (p. vii) (one wonders why), followed by a description (the only one on the page)—"weak herbs [*sic*] growing in damp places, . . . "no recent records." Then come *Lythrum salicaria*, "very common in its habitats" and *L. hyssopifolia*, "extr. rare"—found only indeed in the Croyden Irrigation Fields in 1875—"Fls. homomorphic (Vaucher), which Darwin doubts." This gives a fair idea of the general style of the book; but more startling things are to be found in it—*e.g.* that *Radiola linoides* is "not native, but sometimes found as an escape from cultivation" (p. 87)—if this be suspect, what plant's character is safe? Commentators on Shakespeare will learn with surprise that *Viola tricolor* is the "nodding violet" of that author (p. 97)—a statement the absurdity of which is manifest from the context. We have grave doubts, although we note that this locality (on the same authority) is in the *Flora of Kent*, as to the occurrence of *Impatiens Noli-tangere* as well as *I. biflora* on the banks of the Ravensbourne. *Mimulus Langsdorfii* is not synonymous with *M. luteus* L., and neither is "Musk," as here stated; and the suggestion under *Campanula Trachelium*, the original "Canterbury Bell," that "perhaps the pilgrims had a superstitious regard for the plant, and introduced its seed along the route" (p. 138) is ridiculously improbable.

So we might continue; but *cui bono?* When the work was announced—if we are correct in identifying it with the proposed

Flora of North-west Kent announced in 1906 — we suggested (Journ. Bot. 1906, 143) that some recognized authority should be taken into consultation. Too late to correct the numerous errors, the sheets, as passed for press, were so submitted, and a certain number of corrections then made—including one affecting our citations—are included in the far from complete list of "errata." It is to be hoped that before the issue of a second edition, which is indicated as probable, the work will be thoroughly recast and brought into line with standard local floras.

It remains to be said that lists of the Thallophytes are included, mainly taken from the contributions to this Journal of Messrs. E. M. Holmes and T. Howse. The freshwater algæ are from records by Mr. Rudolf Beer and the "L.C.C. Botany Department, Avery Hill," but there is little indication of other original work. The pages are headed "Botany" throughout, and are thus less easy of consultation than would have been the case had their contents been indicated in the heading.

Illustrated Guide to the Trees and Flowers of England and Wales. By H. G. Jameson, M.A. 8vo, cl., pp. xi. 136. 2s. 6d. Simpkin, Marshall & Co.

This unpretentious little book is admirably adapted for its object "to help the ordinary nature-lover . . . to find out the names of such trees and flowers as he meets with." There is no attempt at scientific arrangement, the plants being first divided into ten groups based on easily observed external characteristics, so that those having no natural affinities are often placed together. These groups are again divided by means of dichotomous keys, leading one sometimes to the Natural Order, sometimes to the genus, and sometimes to the species. Then follow keys on the same plan to those orders not split up under the previous arrangement, and finally there are keys to the genera (arranged alphabetically) which contain more than one species.

The most attractive and at the same time most important feature of the book is the many hundreds of accurate and artistic little drawings in the margin representing the parts of the plant on the distinctive character of which the species or genus is separated. The species are on Benthamian lines, and the Sedges and Grasses are omitted. The author tells us that the book may be used as a companion to Bentham & Hooker's *British Flora* or Johns's *Flowers of the Field*, but we cannot imagine why he refers to Elliott's unsatisfactory edition of the latter, rather than to Boulger's, which is really good.

Mr. Jameson's book is well printed and spaced, lucidly written, and technical terms are used as sparingly as possible. Another good point is the absence of the absurd sham-English names which are found only in botany books, the author recommending in preference the use of the Latin ones. The work is practical and cheap, and should therefore prove useful, but we cannot help

feeling that in adopting an altogether artificial plan there is the danger that a beginner through stumbling over a single character may be led hopelessly astray.

As a draughtsman Mr. Jameson evidently has a special aptitude for hitting off the characteristics of a plant, and if he could see his way to bring out a more complete Flora on somewhat the same lines, but arranged on a natural system, we feel sure that it would be much appreciated.

H. & J. G.

A Tourist's Flora of the West of Ireland. By ROBERT LLOYD PRAEGER. Cr. 8vo, cl. pp. xii. 243. Price 3s. 6d. Dublin: Hodges, Figgis & Co.

WE must not delay to call attention to a handy volume which should be a pocket-companion to every botanist who visits the region of which it treats. There is no need to notice the work at length, for Mr. Praeger's name alone is a guarantee that, so far as the information contained in it goes, it is in every respect satisfactory. What remains to be said, however, is that its arrangement is as admirable as its information is accurate. Beginning with an introduction relating to the district in general, we come to the "topographical section" (preluded by an excellent key-map) dealing with the counties separately; under each of these is given the principal localities—lakes, mountains, &c.—with an indication of the more interesting plants of each: a useful index of place-names concludes this section. Then comes the systematic portion, or flora proper, in which the localities are grouped under each species. But this again is by no means a mere list; interesting notes, descriptive or historical, or dealing with points concerning distribution, occur throughout. The book is rendered additionally attractive by the introduction of a number of illustrations of the more noteworthy plants from photographs taken in their natural habitats; while its usefulness is increased by the insertion of five coloured maps.

"In the matter of nomenclature," Mr. Praeger tells us in his preface, "the book is old-fashioned." As the names used are "almost without exception" those of the *Cybele Hibernica* and *Irish Topographical Botany*, his Irish readers at any rate will not blame him for that, nor will the Saxon tourist complain. The Irish plant-names and place-names—the latter with interesting explanations by Mr. J. H. Lloyd—are printed in Irish characters—a tribute to the influence of the "language movement." We regret that the author has been obsessed by the fetish which demands an "English name" for every plant; such names "are added for the sake of those who find it easier to remember 'Bristle-leaved Spike-rush' than *Scirpus setaceus*," and if such persons exist they will thank Mr. Praeger for his consideration.

The book is well and clearly printed; the cover is eccentric rather than artistic—it is always difficult to convince folk that the plainest lettering is the best.

BOOK-NOTES, NEWS, &c.

At the Annual Meeting of the Linnean Society on May 24th, Dr. D. H. Scott, who was re-elected President, delivered an address which dealt chiefly upon adaptation in fossil plants. The Linnean Gold Medal was presented to Prof. Bower.

At the meeting of the same Society on June 3rd, Mr. A. D. Cotton showed dried and recent specimens in formalin of *Colpomenia sinuosa* Derbès & Sol. from Weymouth, explaining how this Mediterranean species had advanced during the last few years up the French coast into the English Channel; it was believed to act injuriously to young oysters by breaking them adrift on its rising by buoyancy when distended with air. Mr. A. R. Horwood communicated a paper "On *Calamites* (*Calamitina*) *Schutzei* Stur., and on the correspondence between the length of the internodes and the position and function of the short internode in the Genus *Calamites* and in the recent *Equisetaceæ*." The author stated that a specimen of *Calamites Schutzei* Stur., shortly to be figured, exhibits graphically the fistular character of the stem in *Calamites*, a specimen three feet long having been split into two portions longitudinally and so preserved. In the same specimen (from the Main Coal, Stanton-under-Bardon, Leicestershire), and in another from Brighouse, Yorkshire, provisionally referred to this species, the regularly uniform length and position of a short internode at the commencement of each period of uniformly longer internodes are specially marked. In the first case no other figure illustrates the hollow pith in *Calamites* so well, and in the second case the very uniform length of the internodes is extremely interesting. As a result of a study of this specimen and of a comparison made between it and specimens of the recent species of *Equisetum*, it is found that there is a strong resemblance between the two groups *Calamarieæ* and *Equisetaceæ* in the position of the short internode, and a marked similarity in the uniform rate of increase or decrease in the length of the internodes in both groups also, most apparent in *Calamitina*, but probably in a modified form in *Eucalamites* and *Stylocalamites*, and in subterranean stems of *S. Suckowii* there is a strict homology. The function in both extinct and recent groups was probably the same. It does not appear that similar observations have so far been made. The following general conclusions have so far been arrived at from the investigations:—(1) *Position*: The short internode precedes a new period, *i.e.* is situated (*a*) at the base of the aerial stem, (*b*) between branchless and branch-bearing internodes, (*c*) before the strobilus or cone, or (*d*) in *Calamarieæ* before a combination of (*a*) and (*b*). (2) *Function*: Its function appears to be to add strength to the stem by the occurrence of two girder-like nodes (with diaphragms) within a short distance of each other, thus serving the purpose of a double girder. *Equisetum* is regarded as a degenerate form derived from the *Calamarieæ* through *Equisetites*.

In his *Autogamie bei Protisten* (Jena, Fischer; price 2 marks) Dr. Max Hartmann has made a critical examination of the various

instances of autogamous fertilization known to occur among animal and plant Protista in order to show the importance of these processes as true acts of fertilization and also their origin. After discussing several instances of automixis in the Protozoa and in the Algæ and Fungi, the author concludes that all the different processes of self-fertilization are to be regarded as reduced and not as primitive processes; also that "the essence of fertilization consists in the mingling together of two (presumably sexually differentiated) nuclei with consequent reduction of the copulation-nucleus through nuclear division." The results hitherto obtained seem to favour Schaudinn's hypothesis that the cells of the protista are hermaphrodite in character, but that during fertilization this character is disturbed and one fusing nucleus becomes potentially male and the other female. It would seem to us that all cases of isogamous fertilization are based upon sexual differentiation, even although it is not possible to demonstrate any such sexual difference.—S. G.

The question of the extinction of Cryptogamia has been already discussed in this Journal (vol. xlv. 1907, pp. 334–9) by Mr. A. R. Horwood. Further notes on the subject by the same author appear in his Cryptogamic Flora of Leicestershire (Trans. Leicester Lit. & Phil. Soc. xiii. Part i. January, 1909, pp. 15–86). In this paper he gives a list of all new records for the county since 1886 of Mycetozoa, Algæ, Charales, Fungi, Lichens, Hepaticæ, Mosses, and Pteridophyta, together with the localities of the more local and interesting species, as well as a list of plants which have disappeared from the county and another of those which had been erroneously recorded. A chapter is devoted to the ecology and distribution of cryptogams in Leicestershire upon lines similar to those adopted by Messrs. Wheldon and Wilson in their Flora of Lancashire. The paper contains some pretty photographs, and forms a valuable county record.

We are pleased to see that Mr. R. C. Punnett's compact little synopsis of *Mendelism* (Bowes, Cambridge: price 2s.) has now reached the issue of a fifth thousand, the third impression of the second (revised) edition having been published in February. The first edition, published in May, 1905, was noticed in this Journal for 1905, p. 277; the work has since been enlarged from sixty-three pages to eighty-four, and a short index of subjects is added.

We have received the first number of *Dörfleria*, which is described as "an international journal for the furtherance of the practical interests of botanists and botany, bibliography of botanical papers which have not been published independently, and botanical advertiser." It is edited by the publisher, Herr J. Dörfler, of Vienna, whose invaluable *Botaniker Adress-buch* we lately noticed, who, in an introductory article, "What I am aiming at," amplifies the above programme and announces that "news" of various kinds will be a feature of the new monthly. *Dörfleria* will also contain supplements to the *Adress-buch*.

We are glad to note the issue from the Paris Herbarium of a new periodical to be devoted to the description of plants, entitled *Notulæ Systematicæ*, edited by M. Henri Lecomte. The first part, consisting of 32 pages, contains a contribution by Sir Joseph Hooker, who describes nine new species of *Impatiens* from Indo-China, and papers from MM. Gagnepain (*Cratoxylon* and *Sida*), Guillaumin (*Biophytum*), and the editor (*Podostemaceæ*). We note that the titlepage for the volume bearing date 1909 is issued with this first number; this misleading practice is always followed by *Malphigia*, with the result that the ostensible date of the volume seldom if ever represents that of its whole contents. In the latter case, indeed, the inconvenience is aggravated by the fact that the date on the wrappers of the numbers issued for the volume are not always accurate, *e. g.* fasc. ix.–xxii. of vol. xii., dated 1908, were not issued until May of this year. In such cases a new title-page for the volume, on the back of which the correct dates of issue should be printed, should be issued with the last number of each volume.

A convenient little brochure by the Rev. A. C. Morris entitled *First Steps in the Principles of Flower Classification* (*Recorder* Offices, Ilford, price 6d.) comprises "expanded notes of a short course of lectures given to a few students of Botany at Ilford in the fall of 1908," as stated in the introductory note by the author, who is Vicar of St. Mary's, Ilford. The useful little compilation is just what it professes to be, intended for beginners in the study of Field Botany. The definition and explanation of terms are very good, and in several instances clearer (*e.g.* in the case of "perigynous" among others) than in the glossaries of certain long-established manuals. The account of the placentation of the ovary—"we now arrive at the hardest chapter," says the author—leaves nothing to be desired in lucid brevity. It should have a ready sale.—F. N. W.

The late Marshall Ward's work on *Trees* is brought to a conclusion by the issue of the fifth volume (pp. x, 308, price 4*s.* 6*d.* net; Cambridge University Press) which is devoted to form and habit, with an appendix on seedlings. In noticing former instalments we have indicated the characteristics of the undertaking, the conclusion of which has been seen through the press by Prof. Percy Groom. A feature of the work is its wealth of miscellaneous illustrations, derived from various sources; some of them are original, but a large number are very old friends, and are, we think, by this time entitled to a rest; some—*e. g.* the weeping willow (p. 13)—should not have been inserted. The division of the work and the issue of the parts separately perhaps justifies a certain amount of repetition, but we think this is overdone when the same figure appears in three consecutive parts, as is the case with the beech, hazel, chestnut, ash, mulberry, and probably others. The appendix on seedlings, with numerous good original figures by Miss E. Dale, is useful.

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NOTES ON *LIMONIUM*.*

By C. E. Salmon, F.L.S.

VIII.—Limonium Gmelinii O. Kuntze.

In 1797 Willdenow (Sp. Pl. i. 1524) described this sea lavender as follows:—

"*Statice Gmelini*. W. S. scapo paniculato angulato, foliis oblongo-obovatis emarginatis planis cartilagineo-marginatis subtus mucronatis. W. S. caule nudo ramoso, floribus paniculatis, corollis minimis. *Gmel. sib. 2, p. 220, t. 90.* Limonium elatius, floribus parvis dense congestis azureis. *Amm. ruth. 128.* Habitat in Sibiria, locis salsis a Jaico ad Angaram usque. 4. (V. S.)

"Simillima præcedenti [*S. Limonium*], sed *folia* firmiora margine non plicato-undulata, *forma* eorum obovata, *mucro* magis dissitus, *flores* duplo minores magis conferti, et *habitus* totius scapi diversus, distinctam suadent esse speciem. W."

Upon the same page, and following the above description, appears "*S. scoparia*" with a very similar diagnosis, and the remark, "Nomen triviale ob scaporum usum dedit Illustr. Pallas." I have had the opportunity of examining Willdenow's own specimens † of *S. Gmelini* from the Berlin Museum, and also examples of *S. scoparia* from Herb. Pallas in the National Herbarium, and find that they are identical.

In Herb. Willdenow there is also a specimen to which he gave the name of *S. glauca*; Roemer & Schultes (Syst. Veg. vi. 799, 1820) refer to this, giving a short diagnosis from Willdenow's MSS.; this plant proves to be simply a young example of *L. Gmelinii*.

In 1848 Boissier, in De Candolle's *Prodromus*, xii. 645, gave a good and detailed description of our plant, dividing it into two segregates—*α genuina* and *γ laxiflora*—with the following distinctive features:—"*α genuina*, scapo conferte paniculato-corymboso, spicis dense scorpioideis. In omni Rossiâ meridionali, Sibiriâ Altaicâ (Ledeb.) et Baicalensi (Turcz.), Songoriâ (Kar. et Kir.), Hungariâ et Banatu (Wierb., Reichb.), Byzantio (Castagne)"; "*γ laxiflora*, paniculâ amplâ, spiculis laxius spicatis. In Tauriâ, Rossiâ australi ad Wolgam et gubern. Cherson (Fisch.), ad oras orientales maris Caspii (Karelin)."

It may be convenient to keep up the name *laxiflora* for the large-panicled loose-spiked plant, but, as mentioned in this Journal for 1905 (pp. 6, 7), *Limonium* is a most variable genus, and one must not be surprised at constantly finding individuals that will not exactly fit the descriptions of either of Boissier's segregates, or even the more ample diagnosis of his aggregate species.

For instance, Boissier, following Willdenow, states that *L.*

---

* See Journ. Bot. 1903, 65; 1904, 361; 1905, 5, 54; 1907, 24, 428; 1908, 1.

† The cover contains two sheets. No. 1 is *S. Gmelini* W. No. 2, *S. ovalifolia* Poir.

Gmelinii possesses flowers of half the dimensions of those of *L. vulgare*, and this holds good possibly in nine examples out of ten; the tenth may have flowers within an eighth of a line the size of those of *L. vulgare*, and yet be undoubted *Gmelinii*. These large-flowered plants seem to occur more frequently as the species extends westwards.

Again, Boissier asserts that the calyx-lobes are rounded, and rightly so in the majority of cases (and a very valuable character it is), but plants of genuine *Gmelinii* are found in which the lobes are triangular, with an acute apex; these possibly show the passage to var. *Meyeri*. Thus it would be safer to say that the calyx-lobes in *Gmelinii* are *usually* rounded, and always show a much shallower sinus than in *vulgare*.

The shortly-petioled leaves of *L. Gmelinii* provide, also, a valuable distinguishing feature, but in some instances, and under certain conditions, the plant occasionally produces petioles 1½–2 inches long.

To sum up, *L. Gmelinii* may be most readily separated from *L. vulgare* as follows:—By its shortly-petioled leaves, rounded calyx-lobes, smaller calyx, corolla, and bracts, and the outer bract being almost wholly membranous.

Statice Meyeri Boiss.—The first description of this is in DC. *Prodromus*, xii. 645 (1848), where Boissier gives it a detailed and minute diagnosis, referring to it examples from Tauria, Cis and Trans Caucasia, and, a little doubtfully, from Greece. The comparison between it and its nearest allies I translate as follows:—"About intermediate between *S. Gmelini* and *S. Limonium*, approaching the latter in size and shape of spikelets, but distinct by its larger, broader, very shortly petioled more glaucous leaves, by the scape branched from the base, and by the upper bract shorter emarginate. *S. Gmelini*, strongly related by its leaves to our species [*Meyeri*], very greatly differs by its tall scapes only branched above, by the spikes regularly scorpioid, by the broadly membranous bracts, by the flowers half as small, and by the round lobes of the calyx."

In 1879 Boissier (*Fl. Orientalis*, iv. 859) merged his *Meyeri* into his var. *laxiflorum* of *L. Gmelinii*. I have had the opportunity of examining many sheets of *S. Meyeri*, including Boissier's types, Meyer's original gatherings from the Caucasus and numerous Greek specimens; and as the plant has, in my opinion, a habit quite distinct, even when dried, from *L. Gmelinii* f. *laxiflorum*, I should propose to retain it under the name var. *Meyeri*; it hardly seems to justify specific rank.

It is, as Boissier has observed, remarkable for its scape, which is branched usually from quite near the base; for its long patent bare branches and branchlets, which are usually reflexed; and for its calyx-lobes, which are more acute than in type *Gmelinii*. The spikes may be either dense-flowered—as usually in Greek examples—or lax-flowered, as in the majority of Caucasian specimens. I am unable to find that the other distinctions mentioned by Boissier hold good.

It appears to me that the var. *Meyeri* should certainly be placed under *Gmelinii* and not under *vulgare*, on account of its shortly-petioled leaves, membranous outer bract, &c., but Halácsy (*Consp. Fl. Græc.* iii. 16, 1904) places all the Greek plants under "*S. Limonium* L.," under which he gives as synonyms *S. Limonium* var. *macroclada* Boiss. and *S. Meyeri* Boiss. "quoad loca græca."

The synonymy, description, and distribution in Europe of the species under discussion may stand as follows:—

LIMONIUM GMELINII O. Kuntze, Rev. Gen. Pl. ii. 395 (1891).

Statice Gmelini Willd.! Sp. Plant. i. 1524 (1797); Reichb. Ic. Fl. Germ. et Helv. xvii. p. 62! (1855); non Bieb. Fl. Taur. Cauc. i. 250 (1808), nec Koch, Syn. Fl. Germ. ed. 2, pars. 2, 684 (1844).

S. scoparia Pall. ex Willd. Sp. Plant. i. 1524 (1797), and Pall. hb. pro parte!; Bieb. Fl. Taur. Cauc. i. 249 (1808).

S. glauca Willd.! hb. and MS.; Roem. & Schult. Syst. Veg. vi. 799 (1820).

S. Gmelini W. α *genuina* Boiss.! in DC. Prodr. xii. 645 (1848).

Icones.—Gmel. Sib. 2, p. 220, t. 90! (mala!). Reichb. Ic. Crit. 236! Reichb. Ic. Fl. Germ. et Helvet. xvii. t. MCXLI. f. 2!

Exsicc.—Soc. Imp. Nat. Cur. Mosqu. 572! Wolocz. Exsicc. Aust. Hung. 256! Lang et Szovitz, Pl. Ruthen. Cent. i. 90! Brotherus, Pl. Caucas. 794*a*!

Planta *glabra*; folia *glabra late obovata brevissime petiolata*; scapus fere *supra medium* ramosus; rami adscendentes vel adscendenti-patentes; spicæ patentes fere arcuatæ, breves et densifloræ vel longiores et laxifloræ; bractea exterior fere *omnino membranacea*; lobi calycis *brevissimi* et fere *rotundati* dentibus intermediis interpositis; costæ calycis limborum basin sæpe haud attingentes; flores in omnibus partibus *minores* quam ii *L. vulgaris*.

Plant 23–61 cm. high, glabrous. *Leaves* glabrous, pinnately veined, obovate or orbicular-obovate, blunt or acute, mucronate or not, blade often only twice as long as broad, normally very shortly petioled. *Scape* erect, branched from about the middle or above it. *Branches* ascending or ascending-patent and recurved. *Branchlets* patent-ascending or recurved, often subdivided. *Scales* triangular-lanceolate, never foliaceous. *Spikes* patent usually arcuate, short and dense-flowered or longer and lax-flowered. *Spikelets* 1–3-flowered, usually 2. *Outer bract* 1–1½ mm. long, orbicular-ovate or triangular-ovate, rounded and mucronate or apex more acute, usually wholly membranous except for vein. *Middle bract* 2–2½ mm. long, irregularly oblong-ovate, apex rounded and jagged, hyaline with veins. *Inner bract* 2½–3 mm. long, orbicular-ovate, with broad membranous margin, which is often, together with herbaceous portion, emarginate at apex, about twice as long as outer bract. *Bracteoles* 1–2 or absent, 2–2½ mm. long, oblong-ovate, apex rounded, pointed or jagged, hyaline with veins. *Calyx* 3¾–4¼ (rarely 5¼) mm. long, irregularly hairy on veins about

half-way up and between veins near base, some veins glabrous; calyx-lobes very short (about ½ mm.), rounded-triangular or sometimes more acute, often appearing quite sharply pointed owing to lobes being plicate; veins of calyx (often very strong) not reaching as far as base of lobes, or rarely as far. *Corolla* (and occasionally calyx-lobes) lilac, smaller than in *L. vulgare*.

Distribution.—S. and E. Russia! (Tauria! Bessarabia!); Roumania! (Dobrudscha!); Bulgaria!; Thrace (Nyman); E. Turkey! Austria-Hungary! (Banat! Transsylvania!); Greece! (N. Eubæa!).

L. Gmelinii O. Kuntze f. laxiflorum.

Statice scoparia Pall. hb. pro parte!

S. Gmelini W. γ *laxiflora* Boiss.! in DC. Prodr. xii. 646 (1848).

Panicula ampla, spiculæ remotæ raro contiguæ.

Distribution.—S. and E. Russia! Roumania!

L. Gmelinii O. Kuntze var. Meyeri.

Statice scoparia C. A. Meyer, Verzeichniss der Pflanzen im Cauc. 47 (1831), et al. Cauc. auct. non Pall.

S. Meyeri Boiss. in DC. Prodr. xii. 645 (1848).

Limonium Meyeri O. Kuntze, Rev. Gen. Pl. ii. 395 (1891).

Exsicc.—Callier, It Taur. Secund. 305! Meyer, Enum. Cauc. Casp. 560! Orphanides, Fl. Græc. Exsicc. 266! De Heldreich, Hb. Græc. Norm. 495! Dörfler, Fl. Græc. 429! (non typ.).

Scapus fere ab imo ramosus; rami fortiter patulo-recurvi, sæpe elongati et nudi; lobi calycis acutiusculi.

Distribution.—S. Russia! (Tauria!), Caucasia! (Cis! and Trans.!), Greece! (Attica!).

It will be seen from the list of localities that *L. Gmelinii* is not confined to the coast, as are our British species.

ALABASTRA DIVERSA.—Part XVIII.

By Spencer le M. Moore, B.Sc., F.L.S.

(Continued from p. 219.)

2. New or Rare Tropical African Labiatæ.

Hyperaspis Nummularia, sp. nov. Frutex metralis crebro ramulosus ramulis ultimis solummodo foliosis albo-tomentosis deinde glabrescentibus, foliis parvis suborbicularibus (basi sæpissime leviter truncatis) integris utrinque dense albo-tomentosis petiolis quam sese brevioribus tomentosis insidentibus, spicastris brevibus e verticillastris paucis approximatis circa 6-floris compositis, bracteis foliis similibus nisi (ut sæpe) minoribus, pedicellis calyce plane brevioribus albo-tomentosis, calycis fructescentis decurvi anguste campanulati tomentosi lobo postico suborbiculari (basi leviter cordato) in sicco dilutissime puniceo lobis reliquis quam posticus multo minoribus lateralibus deltoideis acutis anticis setaceis lateralibus vix æquilongis.

Hab. Somaliland, Ahl Mountains; *Hildebrandt*, 853.

Folia 5–10 mm. long. et lat., costæ sub indumento denso hac atque illac solum recognoscendæ; petioli 3–4 mm. long. Spicastra pleraque 1·5–3 cm. long. Pedicelli 2·5 mm. long. Calycis tubus 3·5 mm. long.; lobus posticus usque ad 9 × 9 mm.; lobi laterales 2 mm., antici 1·5 mm. long. Nuculæ visæ maxime crudæ. Cetera desunt.

This curious plant, which has long lain in herbaria, was alluded to by Vatke (*Linnæa* xliii. p. 100), who, however, refrained from giving it a name. From Briquet's description of *Hyperaspis Kelleri* (Bull. Herb. Boiss. 1903, p. 995) it is certain that, although its flowers are unknown, the plant under notice is a congener, with many points of specific difference from *H. Kelleri*. When flowering specimens come to hand no difficulty need be apprehended in identifying them with *H. Nummularia*; consequently there is now ample justification for introducing that species to notice.

The calyx is admirably adapted to xerophytic conditions. By the curving of the pedicels its great shield-shaped upper lobe completely covers the calyx, and no doubt preserves the young nutlets from desiccation while they are ripening.

Erythrochlamys spectabilis Gürke in Engl. Bot. Jahrb. xix. 223.

Hab. British East Africa, between Lé and Tocha; *Lord Delamere*.

Acrocephalus (§ Holochili) **lantanoides**, sp. nov. Perennis caule lignoso frequenter folioso ramoso ramis ascendentibus foliosis sursum ramulosis ramulis subtiliter pubescentibus cito ut rami puberulis, foliis parvis sessilibus lineari-oblanceolatis acutis vel obtusiusculis inferne angustatis integris vel obscure undulatis utrinsecus subtiliter sericeo-velutinis, capitulis mediocribus ad apicem ramulorum solitariis a foliis ultimis stipatis nonnunquam ob ramulos minime evolutos in axillis superioribus quasisessilibus, bracteis exterioribus ovatis vel ovato-oblongis sæpe cuspidato-acuminatis apice obtusis sericeis, bracteis interioribus late rotundato-obovatis apice cuspidulatis dorso superne sordide villosis intus glabris nitidisque, calycis villosi tubo labia ovato-oblonga integra obtusissima æquante, corolla tubo calyce duplo longiore superne amplificato labii postici lobo intermedio quadrato-oblongo emarginato lobis lateralibus oblongo-ovatis obtusis labio antico ovato-oblongo obtusissimo labii postici lobo intermedio æquilongo lobis omnibus dorso villosis, stylo leviter exserto.

Hab. Congo Free State, Kundelungu; *Kässner*, 2790.

Folia pleraque 1·5–2·5 cm. long., 3–5 mm. lat., firme membranacea, in sicco griseo-argentina, subtus paullo pallidiora. Bracteæ exteriores sæpius 5–10 mm. long., basi 4–5 mm. lat.; interiores circa 4 × 4·5–5 mm. Calyx 2·5 mm. long., tubus 1·25 mm. Corollæ tubus 5 mm. long., basi 1 mm. faucibus ægre 3 mm. lat.; labium anticum 2·5 mm. long.; lobi laterales 2·25 mm. long., lobus anticus 2·7 × 2 mm. Stylus 9 mm. long.

A very distinct plant, known by its leaves and the solitary flowering heads.

A Nyassaland specimen at Kew (*McClounie*, 46) is apparently identical with this.

Acrocephalus (§ Holochili) **polyneurus**, sp. nov. Caule stricto subtereti dense folioso villosulo tandem scabrido, foliis sæpissime ternis sessilibus brevissimeve petiolatis lanceolato-oblongis obtusis vel obtuse acutis basi obtusissimis paucis summis imminutis in bracteas transeuntibus chartaceis parallele pluri-nervibus piloso-pubescentibus mox glabrescentibus, capitulis pro rata magnis globosis cymam brevem laxam oligocephalam villosulam referentibus, bracteis exterioribus ovatis obtusis chartaceis piloso-pubescentibus haud coloratis interioribus late obovato-rotundatis obtusissimis utrinque albo-villosis intus basin versus omnino glabris, calycis villosi labiis inter se æqualibus suborbicularibus integris, corollæ tubo calycem longe excedente superne leviter amplificato limbo extus albo-lepidoto labii postici lobo intermedio late oblongo ad medium diviso quam lobi laterales oblongi obtusiusculi paullulum longiore labio antico lobis lateralibus subsimilibus leviter cymbiformi, stylo incluso.

Hab. Congo Free State, Kundelungu ; *Kässner*, 2766.

Planta alta circa 35 cm. Folia pleraque 3·5–5 × 1–1·2 cm. (summa ± 1 × ·5 cm.), in sicco olivaceo-brunnea, glandulis immersis creberrime instructa ; costa media dorso valde prominens, ord. sec. costæ utrinque 6–8, maxima pro parte parallelæ, pag. utraque eminentes. Cymæ summum 6 × 6 cm. Pedunculi 2·5 cm. long. vel minus. Capitula 11 × 13 mm. Bracteæ exteriores circa 8 × 5 mm. ; interiores circa 8 × 6 mm. Calyx 1·5 mm. long. Corollæ tubus 4·5 mm. long., basi vix 1 mm., faucibus 1·5 mm. diam. ; labium anticum 2 mm. long. ; labii postici lobi laterales 1·5 mm. long., lobus intermedius 1·7 mm. long., hujus lobuli oblongi, obtusi. Stylus 3·5 mm. long.

Remarkable for the nervation of the leaves. Its position in the genus is next to *A. succisæfolius* Bak.

Acrocephalus (§ Holochili) **Kaessneri,** sp. nov. Caule stricto tetragono folioso tomentoso-villosulo, foliis ternis sessilibus rotundato-ovatis obtusissimis basi levissime cordatis margine crenatis crenulatisve chartaceis utrobique piloso-villosulis, capitulis majusculis globosis in cyma brevi oligocephala piloso-villosula digestis, bracteis omnibus brevibus suborbicularibus margine crispatis extus villosulis sursum verisimiliter albis, calycis villosi tubo limbo æquilongo labio postico ovato-acuto quam anticum suborbiculare emarginatum paullo longiore, corollæ tubo calycem excedente superne gradatim dilatato labii postici lobis lateralibus oblongis obtusis quam lobus intermedius quadratus ad medium usque divisus dorso villosus plane brevioribus labio antico oblongo-ovato postico æquilongo, stylo exserto.

Hab. Congo Free State, Kundelungu ; *Kässner*, 2765.

Internodia inferiora 6–7 cm. long. Folia 1·6-3·5 cm. long., 1·5–3·4 cm. lat., summa ± 1 × 1 cm., costæ secundi ordinis utrinque 9, plures juxta basin folii costæ centrali insertæ ; reticulum laxum ; crenellæ solemniter ·5–1 mm. alt., 1·5–5 mm. long. Cyma circiter 4 × 5 cm. Capitula humectata 1·5 × 1·2 cm. ; pedunculi

± 2 cm. long. Bracteæ modicæ 7–10 × 8–12 mm. Calyx 5 mm. long.; labium posticum 2·5 mm., anticum 1·5 mm. long. Corolla 9-10 mm. long.; tubus 6–7 mm., juxta medium levissime contractus, deorsum ± 1 mm. faucibus ægre 3 mm. lat.; labium anticum 3 mm. long.; postici lobi laterales 1·5 mm., lobus intermedius 2·2 × 1·5 mm. Stylus 9–10 mm. long.

A very distinct species, recognized by the short and relatively very broad ternate leaves, the few-headed cymes, and the indumentum.

Acrocephalus (§ SCHIZEPICHILI) **buddleioides,** sp. nov. Caule sat elato pubescente cito puberulo, foliis distantibus oppositis elongatis lineari-lanceolatis sursum attenuatis margine distanter denticulatis undulatisve utrinque scabriusculis inferioribus longipetiolatis superioribus subsessilibus nisi sessilibus, capitulis mediocribus globosis cymam oligocephalam laxam tomentosam referentibus, bracteis exterioribus anguste oblongo-linearibus obtusis basi amplificatis extus inferne tomentosis alibi scaberrimis margine microscopice crenulatis haud coloratis, bracteis interioribus oblate suborbicularibus dorso superne lana densa dilute brunnea obtectis aliter glabris necnon nitidis, calycis villosi labiis tubum excedentibus inter se æquilongis labio antico ovato-oblongo obtusissimo labio postico late ovato tridentato, corollæ tubo calycem superante superne ampliato labii postici lobo intermedio ovato-oblongo obtuso lobis lateralibus oblongis labio antico lobo postici intermedio subsimili lobis omnibus dorso villosis, stylo breviter exserto.

Hab. Congo Free State, under trees at Kundelungu; *Kässner*, 2772.

Folia inferiora usque 20 cm. long., petiolo fere 5 cm. long. exempto, summum circa 3·5 cm. lat.; folia superiora 7–8 × 1–1·4 cm., summa pleraque 35–50 × 3–7 mm. Cymæ ± 5 × 6 cm.; pedunculi ± 2 cm. long. Bracteæ exteriores sæpissime 10–17 mm. long., interiores circa 5-6 × 7–10 mm. Calyx 2–2·5 mm. long., hujus lobi 1·25 mm. Corollæ tubus 4 mm. long., basi ·75 mm. ore 1·75 mm. lat.; labii postici lobi laterales 1·75 mm. long., labium anticum 2 mm. Stylus 4·5 mm. long.

Distinguished by the long and narrow leaves and the densely woolly heads.

The specimen was accompanied by an unsatisfactory one apparently referable to *A. venosus* Bak.

Hemizygia (§ EU-HEMIZYGIA) **nigritiana,** sp. nov. Caule erecto sursum ramulos breves emittente folioso hirsutulo, foliis lineari-oblanceolatis obtusis basi in petiolum brevem coartatis margine dimidio inferiore integris vel summum repandis superiore serrulatis vel distanter denticulatis denticulis obtusis firme membranaceis pag. sup. mox puberulis inf. griseo-tomentellis, verticillastris sæpissime 3–5-floris in spicastris simplicibus vel subsimplicibus post floritionem elongatis (ita folia tandem longe excedentibus) hirsutulis digestis, bracteis majusculis diutule persistentibus obovatis obtusis unguiculatis puberulis coloratis, calycis florescentis hirsutuli tubo superne leviter amplificato lobo postico

orbiculare margine minutissime denticulato purpureo ceteros setaceos æquante vel subæquante, calycis fructescentis decurvi mediocriter aucti tubo scabrido longitrorsum costato eleganter reticulato-nervoso, corollæ tubo ex calyce eminente labii postici breviter 3-lobi lobis inter se subæqualibus labio antico postice subæquilongo labiis ambobus extus puberulis, staminibus longe exsertis anticorum filamentis alte connatis, stylo exserto bifido.

Hab. South Nigeria, dry zone of Western Province; *A. E. Kitson*.

Folia perplurima 4–6 cm. long., 8–15 mm. lat., sæpe infra spicastra approximata, glandulis immersis copiose inspersa; costæ ord. sec. itaque reticulum pag. inf. mediocriter aspectabiles; petioli summum 1 cm. vix attingentes, sæpissime vero breviores. Spicastra vix profecto evoluta 10 cm. long. vel paullo ultra. Bracteæ circa 8 × 5 mm. Pedicelli 4–5 mm. long., hirsutuli. Calyx florescens totus 7 mm. long., tubus 4·5 mm. long., ima basi 1·75 mm. ore ægre 3 mm. lat.; lobus posticus 2 × 2·5 mm.; lobi laterales 2 mm. long., ut antici fere 3 mm. long. debiles. Calyx fructescens 1 cm. long.; tubus 7 × 4 mm.; lobus posticus 2·5 mm. long.; lobi antici paullo incurvi, rigidiusculi, fere 3·5 mm. long. Corollæ tubus 8 mm. long., dimidio inferiore 1 mm., faucibus 3 mm. lat. Filamenta postica ad 4 mm. antica ad 9 mm. ex corolla eminentia, horum pars libera 1 mm. long.

Near *H. bracteosa* Briq., but certainly distinct by reason of, *inter alia*, the clothing of the various organs, and the different flowering and fruiting calyces.

Icomum lineare Burkill in Journ. Linn. Soc. xxxiv. 270.

Hab. Congo Free State, Mt. Senga; *Kässner*, 2981.

Capitanya otostegioides Gürke in Engl. Bot. Jahrb. xxi. 106.

Hab. Somaliland; *Donaldson Smith*, 389. British East Africa, Dadáro and Lé; *Lord Delamere*.

Calamintha myriantha (*Leucas myriantha* Bak. in Kew Bull. 1898, 163).

Hab. Lusaka, Congo Free State; *Kässner*, 2895.

Tinnea Kaessneri, sp. nov. Caule erecto crebro folioso prominenter angulato dense pubescente, foliis plerumque ternis nonnunquam solitatim oriundis oblongo-lanceolatis apice subito indurato-acuminatis basi acutis integris brevipetiolatis superioribus comparate latioribus in bracteas transeuntibus firme membranaceis pag. sup. cito glabris nitidisque pag. inf. præsertim in nervis scabriuscule pubescentibus, spicastris folia excedentibus dense pubescentibus e verticillastris pluribus bifloris approximatis compositis, bracteis amplis ovatis apice rotundatis subito acuminatis subtiliter pubescentibus, pedicellis calyce brevioribus dense pubescentibus, calyce florescente corolla plane breviore pubescente ut bracteæ inferne viridi vel brunneo superne dilute puniceo calyce fructescente mediocriter aucto vesiculoso-inflato pubescente, corollæ extus glanduloso-puberulæ tubo dimidio superiore dilatato, staminibus anticis subexsertis.

Hab. Congo Free State, Kundelungu, under trees; *Kässner*, 2786.

Folia inferiora 6–8 cm. long., 2–3·5 cm. lat., superiora 2·5–4 × 1·5–2 cm., supra olivaceo-brunnea, subtus griseo-viridia, utrobique crebro glandulosa; petioli ± 5 mm. long. Spicastra summum 14 cm. long., sæpius vero breviora. Bracteæ ± 2 cm. long., et 1–1·5 cm. lat. Pedicelli 2–4 mm. long. Calyx florescens 11 mm. long.; tubus 6 mm. long.; calyx fructescens ægre 2 cm. long., circa 11 mm. diam., brunneus, eleganter reticulatus. Corolla tota 18 mm. long.; tubus 12 mm. long., inferne fere 3 superne 5 mm. diam.; labium posticum levissime undulatum, 3·5 mm. long.; labium anticum 6 mm. long. Staminum anticorum filamenta 7 mm. long., posticorum 5 mm. Nuculæ brunneæ, 8 mm. long.

Nearest *T. physaloides* Bak., but with narrower leaves not rounded at the base and smaller calyx and corolla.

3. New Tropical African Acanthaceæ.

Synnema (§ Eu-Synnema) **angolense**, sp. nov. Perennis, caule debili crebro ramoso repente ad nodos radicante ramos teneros simplices ascendentes superne paucifoliatos subtiliter pubescentes hac atque illac emittente, foliis parvulis brevissime petiolatis nisi sessilibus lanceolato-vel ovato-oblongis utrinque obtusis sparsim glanduloso-pubescentibus, floribus in axillis superioribus solitariis breviter pedunculatis, bracteolis oblongo-oblanceolatis obtusis a calyce paullulum superatis, calycis piloso-hirtuli segmentis inter sese similibus linearibus obtusis, corollæ tubo calycem brevissime excedente superne paullo amplificato ubi puberulo labii postici triente superiore divisi lobis late oblongis obtusissimis labii antici lobis lateralibus oblongis obtusis lobo intermedio obovato, antheris inclusis, ovario lineari-oblongo sursum piloso hujus loculis circa 10-ovulatis, stylo incluso inferne piloso.

Hab. Angola, on rocks at the cataract Cubango; *Gossweiler*, 1915.

Rami ± 10 cm. long., sæpe aliquanto anfractuosi; internodia vulgo 1–2 cm. long. Folia 6–12 mm. long., 3–4 mm. lat., in sicco olivacea. Pedunculi circa 1 mm. long. Bracteolæ 5 mm. long. Calyx 6 mm. long., segmenta ·4 mm. lat. Corollæ tubus purpureo-brunneus, ægre 6·5 mm. long.; limbi violacei labium posticum 3·5 mm. long., hujus lobi 1 mm. long.; labii antici lobi fere 3 mm. long., laterales 1·25 mm., intermedius fere 2 mm. lat. Antheræ 1 mm. long. Ovarium vix 3 mm. long., stylus 2·5 mm.

Nearly allied to *S. Acinos* S. Moore, but different in habit, smaller calyx with equal segments and corolla, &c.

Synnema (§ Eu-Synnema) **Gossweileri**, sp. nov. Rhizomate tenui repente ad nodos radicante caules plures graciles dense cæspitosos gignente, caulibus brevibus ascendentibus sæpius ramosis pubescentibus dein glabris, foliis summum brevissime petiolatis parvulis oblongo-ovatis obtusis sparsim piloso-pubescentibus, floribus parvis in foliorum superiorum axillis distincte pedunculatis solitariis, bracteolis linearibus vel lineari-oblongis quam calyx multo brevioribus, calycis ut bracteolæ piloso-pubescentis segmentis linearibus obtusiusculis inter se fere æqualibus, corollæ

tubo cylindrico calyce paullo breviore limbi tubo vix æquilongi labio postico antico æquilongo triente superiore bilobo, staminibus 4, ovario lineari-oblongo glabro, ovulis quove in loculo circa 12, stylo exserto glabro.

Hab. Angola, wet sandy banks of the Cuiriri River at Sangua; *Gossweiler*, 3034.

Caules circa 4–6 cm. alt. Folia solemniter 3·5–5 mm. long., 1·5–2 mm. lat. Bracteolæ 2·5-3 mm. long., pedunculi totidem. Flores griseolo-cyanei. Calyx 5·5 mm. long. Corolla ægre 6 mm. long.; tubus 3 mm. long., 1 mm. lat.; labium anticum fere 3 mm. long., hujus lobi oblongi, obtusissimi, 2 mm. long., intermedius 1 mm. lat., laterales vix totidem; labii postici lobi oblongi, obtusi, 1 × ·5 mm. Antheræ ovatæ, ·75 mm. long. Ovarium 2 mm., stylus 2·6 mm. long.

Distinguished from the last described by the branching stems, smaller leaves, longer peduncles, short bracteoles, and smaller greyish blue corollas.

Lepidagathis (§ Eu-Lepidagathis) **Kaessneri**, sp. nov. Caule erecto sursum rariramoso tetragono breviter albo-piloso deinde glabrescente, foliis sessilibus breviterve petiolatis oblongo-lanceolatis basi apiceque obtusis margine undulatis vel dentatis nonnunquam dentatis summis imminutis in bracteas transeuntibus pergamaceis utrobique pilis sparsis appressis strigillosis indutis, spicis ovoideis terminalibus vel ex axillis summis oriundis pluriforis, foliis floralibus inferioribus obovatis cuspidulatis dorso appresse griseo-hirsutis superioribus lanceolatis vel lanceolato-linearibus obtusiusculis dorso hirsutis omnibus membranaceis, calycis hirsutuli lobis inferne connatis lobo postico anguste lineari-oblongo quam ceteri lineares paullulum latiore, corollæ tubo calyce paullo breviore sat lato superne levissime dilatato labio postico latissime oblongo usque ad medium diviso lobis emarginatis labii antici lobo intermedio obovato emarginato quam laterales ovato-oblongos multo majore, antheris omnibus 2-locularibus, stylo exserto, ovulis in loculis solitariis.

Hab. Congo Free State, Kundelungu, under trees; *Kässner*, 2774.

Folia solemniter 6-11 cm. long., 2–2·5 cm. lat., summa circa 2–3 × 1–1·5 cm., in sicco olivaceo-fusca subtus pallidiora. Spicæ summum 3-4 × 2–2·5 cm. Bracteæ exteriores ± 10 × 6 mm.; interiores ± 12 mm. long. Calyx 15 mm. long.; tubus circa 6 mm., lobi inter se parum inæquilongi 7–9 mm. Corollæ tubus 11 mm. long., ima basi 1·5 mm. ore ægre 3·5 mm. lat.; labium posticum 7 mm. long., hujus lobi 3 × 2·5 mm.; labii antici 7 mm. long. lobus intermedius 4·5 × 3 mm., laterales 3 mm. Antheræ breviter exsertæ, loculi minime inæquialti, basi mucronulati, 1·5 mm. long. Ovarium anguste oblongo-ovoideum sursum attenuatum, 2 mm. long.; stylus 11·5 mm. long., pilosus; stigmatis rami lineares, ·6 mm. long.

A curious plant, in habit more like a *Barleria* than a *Lepidagathis*, and quite different from any other known to me. Its place in the genus would seem to be next *L. scariosa* Nees.

Phaylopsis Betonica, sp. nov. Caulibus tenuibus verisimiliter decumbentibus fere omnimodo foliosis pubescentibus deinde glabrescentibus, foliis parvis sessilibus vel subsessilibus oblongo-lanceolatis obtusis basin sensim angustatis paullulum vel haud obliquis membranaceo-coriaceis utrinsecus puberulis, spicis cylindricis plurifloris folia circa æquantibus, foliis floralibus obovato-oblongis obtusis sparsim pubescentibus, calycis pubescentis segmento postico oblongo-oblanceolato obtuso segmentis reliquis linearibus anticis quam laterales longioribus necnon latioribus, corollæ tubo superne ampliato calyce paullulum breviore quam limbus bilabiatus longiore, antheris breviter exsertis basi mucronatis, ovario oblongo apice pubescente, stylo incluso piloso-pubescente.

Hab. Congo Free State, Mt. Senga; *Kässner*, 2977.

Caules spithamei vel paullo ultra. Folia pleraque 2·5–4 cm. × 7–10 mm., in sicco (subtus dilutius) luteolo-virentia; cystolithi sub lente nequaquam perspicui; petioli summum 3 mm. long. Spicæ 3–4 × 1·5–2 cm. Folia floralia 10–15 mm. long., 3·5–7 mm. lat., membranaceo-coriacea, eleganter reticulata, costulis sæpe fuscis. Calycis segmenta ut folia floralia margine ciliata; segmentum posticum 13 × 4 mm.; segmenta lateralia 8 × ·5 mm.; antica 10 × 1 mm. Corolla 15 mm. long.; tubus extus puberulus, 10 mm. long., inferne 1·5 mm. lat., superne adusque 5 mm. dilatatus; labii postici 5 mm. long. lobi oblongi, obtusissimi 4 × 2 mm., labii antici inferne palatiferi necnon pilosi 5·5 mm. long. lobus intermedius obovato-quadratus, 3·5 mm. long., summum totidem lat.; lobi laterales oblongi, obtusissimi, 3·5 mm. long. Antheræ 1·5 mm. long. Ovarium 1·5 mm., stylus 8 mm. long.

Homoplastic with several species of *Justicia* § *Betonica*, and easily recognizable by the resemblance.

Barleria (§ Eu-Barleria) **Kaessneri,** sp. nov. Circa spithamea caulibus e rhizomate crasso ascendentibus simplicibus fere a basi foliosis piloso-hispidulis, foliis sessilibus brevissime petiolatis oblanceolatis obtusis vel obtusissimis basi gradatim coarctatis tenuiter coriaceis utrinque glabris, floribus submediocribus ad apicem caulium approximatis inflorescentiam spicatam ovoideam efficientibus, bracteis ovatis nunc obtusis nunc obtusissimis glanduloso-puberulis, bracteolis lanceolatis obtusis calyci subæquilongis, calycis pubescentis lobo postico oblongo-lanceolato acuto lobo antico ovato-oblongo breviter bifido paullulum longiore lobis lateralibus lineari-lanceolatis lobis reliquis plane brevioribus, corollæ cæruleæ tubo cylindrico limbo æquilongo hujus labio postico late oblongo ultra medium diviso labii antici lobis lateralibus oblongo-obovatis lobo intermedio obovato, staminibus perfectis 2 exsertis staminodiis 3 brevibus absque antheræ rudimento, ovario anguste oblongo-ovoideo sursum pubescente, stylo exserto glabro, ovulis quoque in loculo 2 inferiore nano, capsula inferne ovoidea superne rostrata sparsim pubescente 2-sperma.

Hab. Congo Free State, Niember River, under trees; *Kässner*, 3010*a*.

Caulis 2 mm. diam. vel paullulum minus; internodia 2–4 cm.

long., raro ad 7 cm. usque, summa circa 5 mm. Folia 6–8·5 cm. long., 1·5–2·5 cm. lat. (infima ± 4 × 2 cm.), in sicco griseo-viridia, satis prominenter nervosa, cystolithis fac. sup. insigniter aspectabilibus; petioli dum adsint 1–3 mm. long. Spicæ summum 4·5 × 3 cm. Bracteæ ± 1·5 × 1 cm. Bracteolæ summum 16 × 4 mm. Calycis lobus posticus 15 × 5 mm., anticus 14·75 × 6 mm., hujus dentes vix 1 mm. long.; lobi laterales circa 10 mm. long. Corolla 22 mm. long.; tubus 11 mm. long., 4 mm. lat.; labium posticum 11 mm. long., ejus lobi 7 mm.; labium anticum 10 mm. long., lobus intermedius 10 × 6 mm. Filamenta 17·5 mm. long.; staminodia subulata 1·5 mm. long., anticum vix ·5 mm. Ovarium vix 3 mm., stylus circa 15 mm. long. Capsula 14 mm. long.

Near *B. violascens* S. Moore, but differing in foliage, inflorescence, and flowers.

Justicia (§ Rostellularia) **nemoralis**, sp. nov. Caule erecto superne ramoso bene folioso tetragono pubescente, foliis brevipetiolatis oblongo-ovatis obtusis basi rotundatis firme membranaceis pag. sup. scabriusculis inf. pubescentibus, floribus mediocribus in spicis brevibus densis caulem ramulosque terminantibus dispositis, bracteis oblongo-lanceolatis obtusis ut bracteolæ lineari-lanceolatæ quam sese paullo breviores pubescentibus, calycis pubescentis segmentis 5 bracteolas leviter excedentibus inter se fere æqualibus lineari-oblongis sursum attenuatis, corollæ pubescentis tubo calyce plane breviore lato superne leviter dilatato labio antico quadrato palato intruso induto lobis brevibus subæquimagnis labio postico anticum vix æquante late ovato subgaleato bifido, staminibus sub labio postico ascendentibus antherarum loculis magnis ovato-oblongis loc. sup. basi breviter cuspidulato loc. inf. calcare longo incurvo obtuso onusto connectivo latissimo, disco eminente lobulato, ovario ovoideo-oblongo sursum pubescente, stylo inferne puberulo, ovulis quove in loculo 2 superiore nano.

Hab. Congo Free State, Niemba River, under trees; *Kässner*, 3010.

Folia sæpius 5–8 cm long., 2·5–3·5 cm. lat., superiora minora (sc. 2–2·5 × 1–1·2 cm.), in bracteas transeuntes, in sicco viridigrisea; cystolithi parvi, creberrimi; petioli 2–4 mm. long. Bracteolæ circa 15 × 2–2·25 mm. Calycis segmenta 14–16 mm. long., 1·25–1·5 mm. lat. Corolla verisimiliter luteola, 14 mm. long.; tubus 6 mm. long., basi 3 mm. faucibus 5 mm. lat.; labium anticum 8 mm. long., 6 mm. lat., hujus lobi 1 mm. long., lobus intermedius quam laterales paullulum latior; labium posticum 7·5 × 5 mm. Antherarum loc. sup. 2 mm. long., loc. inf., addito calcare 1 mm. long., 3 mm. Discus 1 mm. alt. Ovarium 2·5 mm. long., stylus 11 mm.

To be inserted in the genus next *J. simplicispica* C. B. Cl., differing from it in the leafy stems with larger leaves, the longer and narrower bracts and bracteoles, the much longer calyx-segments with the upper as long as the rest, &c.

4. A New Embelia from Rhodesia.

Embelia oleifolia, sp. nov. Ramulis erecto-ascendentibus rigidiusculis crebro foliosis cito omnino glabris, foliis parvulis lineari-lanceolatis lanceolato-oblongisve obtusis rarius acutis nonnunquam obtusissimis vel etiam retusis basin versus in petiolum brevem attenuatis pergamaceis minute rubro-lepidotis, floribus fem. solummodo obviis in paniculis subracemiformibus maxime abbreviatis (sc. foliis multo brevioribus) basi nudis ex axillis foliorum vigentium oriundis dense ac minute rubro-lepidotis tandem glabris, floribus tetrameris, calycis lepidoti lobis late deltoideis obtusis vel obtusissimis tubo circiter æquilongis, corollæ calycem plus quam duplo excedentis lobis deorsum breviter connatis subrotundato-ovatis obtusissimis, ovario subgloboso appresse albo-hirsuto minutissime lepidoto, stigmate subsessili 4-lobo.

Hab. Rhodesia, Bulawayo; *R. F. Rand*, 504: *E. C. Chubb*, 31.

Ramuli mox cortice griseo vel griseo-brunneo obducti. Specimini florentis folia 3–4 cm. long., in medio 1 cm. lat., specc. fructificantium 4–5·5 × 1–1·8 cm., in sicco griseo-viridia, subtus pallida; costæ secundariæ utrinque 5, tenerrimæ, ascendentes vel ascendenti-patulæ cito dichotomæ; petioli 3 mm. long., deinde 5 mm. vel etiam longiores. Paniculæ vix unquam longitudinem 1 cm. attingentes. Pedicelli 1·5–2 mm. long., crassiusculi. Calyx 1 mm. long. Corolla 2·5 mm. long., circa totidem diam.; loborum dextrorsum obtegentium dorso puberulorum pars connata ·5 mm. long. Ovarium 1·2 mm. long.; stylus ·4 mm.; stigmatis lobi oblongi, obtusiusculi, ·3 mm. long. Drupa 5 mm. diam., olivacea, microscopice lepidota, necnon pilorum reliquiis dissitis onusta.

To be inserted in the genus next *E. Welwitschii* K. Schum., but with too many points of difference to make detailed comparison necessary.

(To be continued.)

JOHN CLAYTON.
(1686–1773.)

By James Britten, F.L.S.

The *Dictionary of National Biography* has attained a deservedly high reputation for general excellence and accuracy; at times, however, we come across articles which seem to have been compiled with extraordinary carelessness and are consequently the reverse of informing.* An example of this will be found in Mr.

* I have before called attention (Journ. Bot. 1888, 285) to the singularly unsatisfactory notice of Robert Brown. There is an odd slip in vol. xiii. p. 313, where Brown is said to have "complimented Cunningham by calling after his name *a species of the madder tribe*;" *Cunninghamia* is of course coniferous. Another misleading statement will be found in vol. xxxvii. p. 240, where it is stated that Miller adopted the Linnean nomenclature in ed. 7 of the *Gardener's Dictionary* (1759): it was not until the eighth edition (1768) that the binominal nomenclature was adopted.

Robert Hunt's notice of John Clayton (Dict. Nat. Biogr. xi. 13), whose collection of Virginian plants, although not the earliest made in the country, may be regarded as the foundation of our knowledge of the botany of that region. Under this heading two persons are combined—a fact which is at once evident when it is pointed out that the date when the first paper was contributed to the *Philosophical Transactions* was 1688, while the date of birth* of the supposed author, as given by Mr. Hunt, is 1693.

The best account of the botanist Clayton is that given by B. S. Barton in *The Philadelphia Medical and Physical Journal*, ii. 141–145, based largely upon information contributed by various folk who knew him personally. As this is not easily accessible, we extract from it the following:—"He came to Virginia, with his father, in the year 1705, and was, most probably, then in his twentieth year. His father was an eminent lawyer, and was appointed attorney-general of Virginia. Young Clayton was put into the office of Mr. Peter Beverly, who was clerk or prothonotary, for Gloster-county, in Virginia. He succeeded Mr. Beverly as clerk of that county, and filled the office fifty-one years. He died on the fifteenth of December, 1773, in his eighty-eighth year. During the year preceding his decease, such was the vigour of his constitution, even at this advanced period, that he made a botanical tour through Orange-county. It is believed that he had visited most of the settled parts of Virginia. He left behind him two volumes of manuscript, nearly copied and prepared for the press; and a *hortus siccus*, of folio size, with marginal notes, and directions for the engraver, in preparing plates for his proposed work. Mr. Jasper Clayton, grandson of the botanist, says that this work, which was in the possession of his father when the revolutionary war commenced, was sent to a Mr. William Clayton, clerk of New-Kent, as to a place of safety against the invading enemy. It was lodged in the office, with the records of the county. An incendiary put a torch to the building, and thus perished, not only the records of the county, but the labours of Clayton." The account contains a warm tribute to Clayton's personal qualities, and to his botanical enthusiasm: "such was his desire to obtain a complete knowledge of the plants of Virginia that, notwithstanding his great parsimony, he would offer a reward for any discovery of a plant unknown to him." His son was "the doctor of his parish." Barton, who adds a warm appreciation of Clayton's botanical attainments, says that "he was not brought up to the profession of physic, much less had he received the degree of Doctor of Medicine," as is stated on the titlepage of the second edition of the *Flora Virginica*. Barton regrets that the *Flora* should be referred to as "the work of Gronovius, though its great value is derived from the masterly descriptions communicated to the Leyden professor by Mr. Clayton." It is difficult, however, to see how else it could be quoted, and in the dedication

* It is stated that Clayton was born "at Fulham, in the county of Kent": Fulham, Middlesex, seems to have been intended.

prefixed to the second part of the *Flora* as well as in that of the second edition, both J. F. and L. T. Gronovius give the fullest credit to Clayton for his work.

The account given by Mr. Hunt differs from the above in important particulars: the earlier portion runs thus:—"His father was the attorney-general of Virginia, and the son left England and joined him in 1705. He appears to have studied *medicine*, *botany*, and, to some extent, chemistry. He sent to the Royal Society, in 1739, a statement of 'Experiments concerning the Spirit of Coals,' which paper was published in the Philosophical Transactions.' *Through the influence of his father, Clayton was appointed secretary of Gloucester county, which office he held for many years.* His position allowed him the leisure for studying the soil and atmospheric phenomena affecting the vegetation of the state, *and for collecting specimens of its flora.* Eventually he sent to the Royal Society the results of his observations, which were published in volumes xvii. xviii. [1693–94] xli. [1739] of the 'Philosophical Transactions.'" Passing over the first sentence, this account, with the exception of the words I have italicized, relates to the Rev. John Clayton, who resided in Virginia for some years and started on his homeward voyage in May, 1686. His first contribution was sent to the Royal Society May 12, 1688, by which time he was "rector of Crofton at Wakefield in Yorkshire," and published in Phil. Trans. xvii. 781–795. Further accounts of Virginia—the climate, people, animals, birds and the cultivation of tobacco—appeared in Phil. Trans. xvii. 941, 978 and xviii. 121.* After his death, at which time he was Dean of Kildare, there appeared in Phil. Trans. xli. (1739) a further paper which "may serve as a sequel to the accounts of Virginia formerly given," dealing largely with the uses of the native plants, and three short chemical papers; these were communicated by Robert Clayton, then Bishop of Cork, who was probably John's brother. Robert was one of eight children; his father had been Dean of Kildare (Dict. Nat. Biogr.). I am inclined to think that John Clayton the botanist, who "was a strict though not ostentatious observer of the practice of the Church of England" (Philad. Journ. ii. 142) was nephew to the Rev. John Clayton and to the Bishop.

The remaining portion of Mr. Hunt's article, which refers to the botanist Clayton, abounds in errors, which it may be well to take the opportunity of correcting. It runs: "These papers secured him the friendship of many of the European naturalists; especially he corresponded with the celebrated Dutch naturalists, the brothers Gronoy or Gronovius. To these Clayton forwarded dried plants, and in connection with the celebrated Swedish naturalist, John Frederick Gronovius, they published 'Flora Virginica exhibens Plantas quas in Virginia Clayton collegit,' Leyden, 1739 and 1745. These parts were reissued after Clayton's death

* It may be noted that in the General Index to Phil. Trans. i.–lxx. the four first papers placed under Robert Clayton should be assigned to John, and that the former is styled Bishop of Cloyne instead of Bishop of Cork.

in 1782. This work was the first flora of Virginia published, and it contained many new genera. Gronovius (Laurence, as his brother John Frederick died in 1760) affixed the name of Clayton to a genus of plants. The Claytonias are perennial, rare in cultivation; but the *C. virginica* is sometimes met with. These plants are popularly known in America by the name of 'spring beauty,' from the early season at which they flower. Clayton died in 1773."

"The celebrated Dutch naturalists, the brothers Gronoy [Gronow] or Gronovius" and "the celebrated Swedish naturalist, John Frederick Gronovius" may be resolved into the last named (who was of Leyden) and his son Laurens Theodor (1730–1777) of the same place,* who wrote the preface to the second edition (1762) of the *Flora Virginica*—he had nothing to do with the first. "The parts" were not "reissued"; the second edition is a new book, and did not appear in parts. Nor was it issued "after Clayton's death in 1782," as Mr. Hunt would have seen had he consulted the dedication by L. T. Gronovius to Clayton, or the titlepage, which gives 1762. Finally, it was not Laurence Gronovius who "affixed the name of Clayton to a genus of plants," but J. F. Gronovius, from whom Linnæus quotes it in Gen. Pl. 339 (1737) and who published it in *Fl. Virginica* in 1739 (p. 25).† The horticultural note with which Mr. Hunt's notice concludes seems curiously out of place in the Dictionary, but is as inaccurate as the rest, for the Claytonias are not all perennial, nor are they "rare in cultivation."

It would appear that Gronovius, in the opinion of his contemporaries, delayed the publication of the first edition of the *Flora*. Writing to Haller, Oct. 8, 1737, Linnæus says: "Gronovius will, doubtless, soon publish the plants sent by Clayton from Virginia, unless he considers too long about the matter"; and again (Jan. 23, 1738): "I wish he had not so long hesitated to publish his book; he is too timid" (Linn. Corr. ii. 300, 314). With regard to the second (1762) edition, Collinson quotes Clayton as having written on Sept. 7, 1757, "at last I have completed a new edition of the *Flora Virginica*" (op. cit. i. 42); and Ellis, writing to Linnæus, April 25, 1758, writes: "Mr. Clayton of Virginia has lately sent Mr. Collinson his *Flora Virginica* greatly enlarged and improved. Mr. Collinson has put it into my hands to look it over. It is intended to be published immediately, as soon as the plates can be got ready, which Mr. Ehret has undertaken, and to dissect each new genus, to shew your system the better. I am now writing to Mr. Clayton to dispatch as soon as he can all the specimens of the rarer plants to New York, to come

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* He was, like his father, a Senator of Leyden, and a capable ichthyologist; his collection of fishes and an illustrated MS. relating to them are in the British Museum, and form the subject of a Catalogue published by the Museum in 1854.

† The date—1743—on the titlepage of some copies of this part shows that a reprint (which I do not find anywhere mentioned) was issued; the date of original publication—1739—as given by Pritzel and others, is correct, as is shown by its inclusion by Seguier in his *Biblotheca Botanica* (p. 78) published in 1740.

by the packet, that we may not delay the work" (*op. cit.* 93). From this it would appear that the second edition was intended to be illustrated.

There are seven letters from Clayton to Bartram on botanical subjects in *Memorials of Bartram*, 406–412. In one of them (Sept. 1, 1760) is a reference to a new plant that "was to be called *Amsonia*, after a doctor here," but which Clayton subsequently referred to *Nerium*; it was probably communicated to Linnæus, who had it from Gronovius by that name, as it stands as *Tabernæmontana Amsonia* in Sp. Pl. ed. 2, 308 (1762); Miller (Gard. Dict. ed. 8) says it "had the title of *Amsonia* given to it by Mr. Clayton, who first discovered it in Virginia." Smith, in Rees Cyclop. xxxv, under *Tabernæmontana* writes: "Linnæus, in his own copy of Gronovius's *Flora Virginica*, ed. i. p. 26, has written *Amsonia*, as a generic name, to what Clayton took for a species of *Nerium*. . . . This plant in the second edition of Sp. Pl. is the *Tabernæmontana Amsonia*, and so it remained till Mr. Walter renamed it to rank as a genus." Smith (*l. c.*) speculates as to the origin of the name, which according to Britton & Brown (Ill. Fl. N.U.S. iii. 1) commemorates "Charles Amson of South Carolina": Clayton's reference would seem to imply that some Virginian was intended, and in *Gray's New Manual* the name is given as "Dr. Amson, physician of Gloucester, Virginia"—perhaps an inference from Clayton's mention.

The destruction of Clayton's own herbarium referred to above renders the collection of his plants incorporated with the National Herbarium of primary importance; this indeed was recognized by Asa Gray, who frequently consulted it, as have subsequent American authors. These are the specimens which J. F. Gronovius had before him when compiling the *Flora Virginica* and are accompanied by his MS. descriptions and references to the numbers assigned to them by Clayton and to the page where they are described in the *Flora Virginica*; the references to the second edition were probably added by the younger Gronovius. J. F. Gronovius was helped by Linnæus in the examination of Clayton's plants and in return gave Linnæus many duplicates, which are in his herbarium. J. F. Gronovius's whole herbarium consisted of upwards of 252 volumes; the portion containing Clayton's plants was purchased in 1778 for £90 (or £100, according to Robert Brown) by John Earl of Bute, at whose sale Banks bought it in 1794 for £44 2*s*.

CAREX CANESCENS L.

By G. Claridge Druce, M.A., F.L.S.

In an interesting and suggestive paper (*Journ. Bot.* 1908, 369) Mr. F. N. Williams, following the lead of the Rev. E. S. Marshall (*Journ. Bot.* 1907, 365), cites Lightfoot (*Flora Scotica*, ii. 550, 1777) as the authority instead of Linnæus for the name of the sedge afterwards called *C. curta* by Goodenough (*Trans. Linn.*

Soc. ii. 145, 1794). Mr. Williams seems to have been influenced by some (of course unintentional) misrepresentations made in Mr. Marshall's paper. As many botanists have not access to the Linnean herbarium, I should like to put before them another side of the case.

As has more than once been pointed out, too much stress must not be laid upon the specimens in the Linnean herbarium. Where the specimen agrees with the description it is the type; in other instances no such claim can be made. Again, care must be taken to avoid confusing Linnæus's own writing with that of later annotators; and Linnæus in some instances has, perhaps subsequently, put in plants which do not represent the species as established in the *Species Plantarum*; for instance, *C. atrata* is represented by *C. atrofusca*, *C. uliginosa* by *C. chordorrhiza*, and *C. canescens* by *C. polygama*. In several cases two or more species are on the same sheet; for instance, *C. arenaria* with *C. divisa* Huds., *C. brizoides* is represented by *C. canescens* and *C. elongata* (*teste* Smith).

In Mr. Marshall's paper (*l. c.* p. 365) we read: "11. *C. canescens*. Two very different species are thus named in Herb. Linn. The first (under which is written 'Norfolc.') annotated by Smith as 'divulsa—Good. and Fl. Brit.' is certainly that." This sheet is not named by Linnæus; there is on it only one figure written by Linnæus, and that figure is not 11, which refers to the number in *Sp. Pl.* ed. i. for *C. canescens*, but 9, which refers to *C. loliacea*. If the description of that species be read, it will be seen Linnæus might easily think the specimen of *C. divulsa*, which is on the sheet labeiled by him 9, belonged to *loliacea*, since he says "differt a *C. muricata*, cui simillima," whereas *C. divulsa* in no way resembles *C. canescens*. Neither is the word "Norfolc." on the sheet written by Linnæus; it is in Smith's hand, who has most unwisely put in the habitat, as if the specimen came thence; the name *divulsa* is, as Mr. Marshall says, also in Smith's writing. Therefore the contention drawn from the evidence of the herbarium specimen that *C. divulsa* represents *C. canescens* is without foundation.

The paper continues:—"As tending further to prove that Linné did not really regard *curta* as his *canescens* may be mentioned the reference to Micheli, *Gen.* 69, t. 23, f. 10, in ed. 2:—'Carex nemorosa, fibrosa radice, caule exquisite triangulari, spica longa divulsa seu interrupta, capitulis solitariis præterquam ultimo.' *C. curta* is not (or very rarely) a woodland plant, and the above description fits *C. divulsa* admirably." For some time this was a cryptic utterance to me, since I was unable to find Micheli's synonym either in the second or any edition of the *Sp. Pl.* or *Flora Suecica*. Eventually, however, it was found in Hudson's *Flora Anglica*, and is there rightly quoted by that author, since Hudson's *C. canescens* is *C. divulsa*. Therefore Hudson's synonym has nothing to do with the Linnean species in question. It is true that the synonym quoted in *Sp. Pl.* from *Flora Lapponica* does not suit *C. canescens* (probably referring to *C. polygama*),

but *C. canescens* is based not on the plant of *Flora Lapponica* but on that described in *Flora Suecica*, a work not quoted by Mr. Marshall.

The confusion respecting *C. polygama* (*C. Buxbaumii*) has been long known; for instance, Andersson (*Cyp. Scand.* p. 58, 1849) says:—"Auctores Anglici Linnæum *C. canescentis* nomine *C. brizoideum* v. *C. Buxbaumii* intellexisse contendunt, quare nostram C. canescentem *C. curtam* dixerunt. Quæ transmutatio nominume confusione minime insolita speciminum, quæ in herbario Linn. asservantur, evidenter orta est, quare nomen a botanicis suecicis semper adhibitum heic jure recepimus." Wahlenberg, Blytt, Hartman, Norman, and the great majority of European botanists use the name *C. canescens* in this sense. But if, for the sake of argument, we say that *C. canescens* L. is too vague a name to be used, would it be permissible to write *C. canescens* Lightf.? I do not think so. Hudson, in *Flora Anglica*, 1762, has a *C. canescens* which is *C. divulsa*, and this would then come into competition (Hudson has also a *C. brizoides* which is *C. canescens* L.), since, despite some erroneous synonyms, the one he quotes from Ray, his English name Grey Carex, and its habitat, "ad sepes et in sylvis humidis," excludes *C. canescens* L. Moreover, in ed. 2, Hudson adds the synonyms from Micheli, already quoted, which represents *C. divulsa*. In fact, the *C. canescens* Huds. of both editions, despite the reference to *Flora Danica*, t. 285, in the later one, which is that cited in *Index Kew.* = *C. divulsa* Stokes.

Indeed, Lightfoot (*l.c.*), describing *C. canescens*, bases it on the plant of *Sp. Pl.* p. 1383, cites Micheli (*Gen.* 70, n. 5, t. 33, f. 18), Loesel (*Fl. Pruss.* 117, t. 32 bona), and Oeder (*Fl. Dan.* t. 285?), and gives it the name "White Carex." He says "this is undoubtedly the plant which Ray (*Stirp. Angl.* 423) intends by 'Gramen cyperoides palustre elegans spica composita asperiore,' which some authors make to be a synonym of *C. brizoides* L., which we have never yet found in Great Britain."

Stokes (*With. Nat. Arr.* ii. 1035, 1787) calls his *C. divulsa* the Grey Carex, quotes Micheli's figure, cited by Hudson, for his *C. canescens*, gives Hudson's *C. canescens* as a synonym, and goes on to show the difference between the *C. canescens* of Hudson and Linnæus by saying that the latter is "characterized as having bluntish capsules"; in the former they are "pointed, upright." Its habitat being "moist shady places; in woods and hedges," and Stokes adds, "also in meadows." Withering, following Pollich, uses the name *C. cinerea* for *C. canescens* L. Goodenough (*Trans. Linn. Soc.* l. c), it is true, describes *C. curta* as a distinct species, because, influenced by a specimen in Herb. Banks, he thought *C. canescens* L. = *C. brizoides* L. His own words are:—"As I take it for granted that *C. curta* is not the *brizoides* of Linnæus, . . . I have restored Loesel's name, *curta*. Linnæus applies this figure of Loesel to his *canescens*, but, I have always thought, without sufficient authority; and I am happy in being countenanced in this idea by our worthy President's remarks in his edition of the

Flora Lapponica. See n. 332." Thus Goodenough, who founded *C. curta* as distinct from *C. canescens* L., does not suggest the identity of the latter with *C. divulsa*.

Having shown that there is no contemporaneous or immediately subsequent suggestion that *C. canescens* L. is *C. divulsa* Stokes, and that the more recent ones are based upon misconception, let us examine the evidence afforded by the works of Linnæus.

The herbarium shows that No. 11, labelled *C. canescens*, is represented by *C. polygama* Schukhr, and that the plants labelled *C. brizoides* are partly represented by *C. canescens*. Therefore, if the herbarium were the decisive factor, *C. polygama* Schukhr = *C. canescens* L. But Linnæus's *C. canescens* (*Sp. Pl.* 974) is primarily based upon "Carex spiculis subrotundis remotis sessilibus obtusis androgynis, capsulis ovatis obtusiusculis. *Fl. Suec.* 745 [754]." This cannot allude to *C. divulsa*; while Loesel's figure (*Fl. Pruss.* t. 32), "Gramen cyperoides spicis curtis divulsis," which Linnæus cites, is not only the plant, but contains the very word "curtis" which Goodenough uses to designate his *C. curta*.

I may add that Norman in his elaborate work on plant distribution (*Arktiske Flora*) has two pages of localities for *C. canescens* in Norway, but does not mention *C. divulsa*, nor does Hartman include it in his *Handbok*, while Nyman (*Consp. Fl. Europ.* 781) only gives *C. divulsa* for "Suec. mer. med.," whereas *C. canescens* is found "in pal. aquosis totius Suec. frequentis." Dr. Murbeck has, however, found *C. divulsa* in S. Norway; see *Bot. Notiser*, 1885, 82.

We may therefore with some confidence assume that the species afterwards called *C. curta* Good. is the *C. canescens* of the *Species Plantarum*, notwithstanding the specimen in Linnæus's herbarium and the somewhat faulty synonymy; and we may dismiss the idea that it is in any way synonymous with or related to the widely different species *C. divulsa*.

FORMS OF *SENECIO VULGARIS*.

By A. H. Trow, D.Sc., F.L.S.

[In the third part of his *Flora of Glamorgan* (pp. 91-93) Dr. Trow gives an interesting account of forms of Groundsel. Four distinct forms and their hybrids occur in the neighbourhood of Cardiff; one radiate type attracted his notice as early as 1891, and the occurrence of other forms led him "to submit all the forms to a process of testing by means of experimental 'pedigree' cultures." These experiments began in 1905 and are still in progress.

Dr. Trow recognizes four segregates, of which "hybrids probably occur in every possible combination"; some have been obtained experimentally; a full account of the experiments will

be published later. The following description of the forms, of which Dr. Trow has sent an excellent series to the National Herbarium, will be read with interest.—Ed. Journ. Bot.]

(a) *præcox* Trow. This form, when young, has a somewhat zigzag stem, with few but very long internodes; the leaves are nearly plane and not deeply pinnatifid as in the other types; the main axis, too, is soon overtopped, and even pushed aside by a lateral branch; and the capitula are small and slender. The time from the date of sowing to the production of ripe seeds, a time which may well be called a "generation," is seventy-two days (March 30th, 1908, to June 10th, 1908). This form exhibits definite adaptations in all its parts to secure rapid development and early maturity.

(b) *erectus* Trow. This form has many rather short and stout internodes, and a straight erect stem. The leaves are deeply pinnatifid, indeed pinnatisect, somewhat yellow-green in colour, and strikingly pectinate when half developed, especially near the apex of the stem. The capitula are of medium size. A generation equals eighty-three days (March 30th, 1908, to June 21st, 1908).

(c) *erectus* var. *radiatus* Trow. This is the radiate form of the preceding type. I cannot, indeed, distinguish the one from the other at any time up to the moment when the flowers begin to appear, when of course the difference becomes very obvious. The ray florets are sometimes very long, and are revolute only at night, in bad weather or in old flowers, the number per capitulum ranging from eight to thirteen. The ray florets do not correspond to the figure in Sowerby's *Eng. Bot.* ed. 3, which is no doubt drawn from a Channel Island specimen. A generation equals eighty-three days.

(d) *multicaulis* Trow. This is readily recognizable by the following characters:—(1) the dark green colour with a greyish surface tone; (2) leaves like those of *erectus*, but longer; (3) large capitula, broad and rather short; (4) the soft yellow colour of the disc florets; (5) the browning of the disc after pollination; (6) the short basal internodes (ten or more), and hence the biennial appearance when young (leaf rosette) and the production of *numerous stems* (*multicaulis*) springing from the base later; (7) the long internodes of the upper branches, giving an open character to the inflorescence; (8) a long conspicuous bract on the pedicel of the terminal capitulum; (9) long bracts subtending the upper branches; (10) the tendency to keep the capitula nearly erect during the ripening of the fruit; and (11) the large cotyledons of the seedlings. A generation equals ninety days (March 30th, 1908, to June 28th, 1908).

Upon the whole *præcox* may be described in gardener's terminology as *early*, *multicaulis* as *late*, and *erectus* as *intermediate*.

The radiate form with short sometimes almost erect and distinctly toothed rays is the hybrid of *erectus* var. *radiatus* with one of the other forms, generally *erectus*.

These four segregates maintain their distinctive characters

when grown side by side under the same conditions and protected from cross-pollination.

The hybrid segregates according to Mendel's law. In one test culture—of seeds taken from a single individual of the hybrid *erectus* × *erectus*, var. *radiatus*—which comprised 449 plants, the progeny proved to be as follows:—

erectus individuals . . .	= 109
erectus var. *radiatus* individuals .	= 114
hybrids, like the parent plant .	= 226

The numbers required by Mendel's law for a culture of 448 plants would be 112, 112, and 224.

The hybrid *erectus* × *squalidus* appears to occur—indeed, I have one living specimen collected in Cathays Park, which can scarcely be anything else. I have failed, however, to obtain this hybrid experimentally. Six different experiments, extending over two years and involving the raising of hundreds of plants, produced no result.

TWO NEW BRITISH HEPATICÆ.

By Symers M. Macvicar.

Sphærocarpus californicus.

Sphærocarpus californicus Austin in Bull. Torr. Club, vi. 305 (1879). Differs from *S. Michelii* Bellardi (*S. terrestris* Sm.) in its mature female involucres being cylindrical-clavate, more than twice as long as broad, spore-tetrads 120–140 μ in diam., reddish-brown, the areolæ 5–7 in number across the face and always distinct, 15–24 μ in diam., margin of tetrad appearing crenulate, without spines, the entire surface minutely granulate.

Hab.—Garden, Birdsgrove, Woking, Surrey, *leg.* Mrs. Wood, April, 1909.

In *S. Michelii* the mature female involucres are pyriform, hardly twice as long as broad, the tetrads are 84–104 μ in diam., darker coloured and more opaque, areolæ 5–10 μ across face and only 8–14 μ in diam., and the margin of tetrad appears spinous. I have not found the longer cells at the mouth of the involucre in *S. californicus* to be a character of much, if any, assistance in the few specimens which I have seen. Prof. Douin (Rev. Bryol. 1909, 37) states that the mature male involucres form a character of value, as in *S. californicus* they are only about twice as long as broad, while in *S. Michelii* they are 3–5 times as long as broad.

In *S. californicus* the ridges which form the areolæ on the spores are only slightly elevated at the angles, so that in profile the tetrad appears as if crenulate, the intervals between the raised points being somewhat emarginate. In the other species the angles are raised into spines, the profile being spinous.

Whatever difficulty there may be in distinguishing the two

species by their involucres, there is none when fruit is present, the difference in the tetrads being so great.

Douin first published *S. californicus* as European in Rev. Bryol. 105, 1907. He found that it was more common than *S. Michelii* in Eure-et-Loir, and that the plant which Boulay describes in *Hépatiques de la France* as the latter is most probably the former. He considers that it will most likely be found to be the commoner of the two throughout France. The two species grow close to one another or separately.

The discovery of *S. californicus* in Britain is due to Mrs. Wood, who, having heard from Miss C. E. Larter that I was anxious to examine English specimens of *Sphærocarpus*, kindly sent me plants in December, 1907. These were without fruit, but in April of the present year further specimens were sent which were in fruit, and which allowed of certain identification. It has only as yet been found with us in a garden and in a neighbourhood, as Mrs. Wood informs me, where there are several nurseries. It is, of course, desirable that it should also be found elsewhere, but it must be remembered that our other species is found only in or near cultivated ground, as is the case elsewhere in Europe, such delicate plants being unable to compete with other vegetation except on the bare spots of frequently disturbed ground. It may be the case, moreover, that *S. californicus* is more frequent with us than is the other species. All the available evidence points to it not having been introduced from America with nursery plants. In the first place it must be borne in mind that this is a southern genus which is absent, so far as known, from the north-east States of America. Stephani, in Spec. Hep. (in Bull. Herb. Boissier, 1899, pp. 655-8), gives the localities known for *S. californicus* as California, Louisiana, and Missisippi. The question then arose as to the districts from which our American plants were derived. To elucidate this, Mrs. Wood wrote to Mr. Antony Waterer, one of the largest nurserymen in the neighbourhood of Woking, from whom she had obtained the shrubs. The answer was that he had not received any plants from America for thirty years, and that the plants previous to this had come from New York and Boston, but with no soil attached; also that he never had plants from California, Louisiana, or Mississippi, or had any shipped from New Orleans. He also stated that he believed the principal American nurserymen who export plants to England do so from Rochester and New York. Another nurseryman near Woking, from whom shrubs had been obtained, stated that his plants, such as azaleas, kalmias, &c., were imported from Holland, and that he believed this was the case with most men who imported them. Mrs. Wood then wrote to Messrs. Veitch, Chelsea, who replied that their American plants came solely from Boston, Mass., and Charlotte, Ver., also that most of the American plants not grown in this country are brought from Holland, but that Belgium produces larger quantities of azaleas.

I have gone into the question in this detail, as the distribution of *S californicus* in Europe is little known yet, it only having been

recently distinguished from *S. Michelii*, and it may really be, as above mentioned, the commoner of the two. In the meantime an examination of specimens from the English localities at present given for *S. Michelii*, as well as those in herbaria, would be interesting; also a more detailed search in suitable localities in Surrey. The plants are stated to be in fruit from March to the end of June. It may be added that Mrs. Wood first found the *Sphærocarpus* ten or twelve years ago, when her garden was comparatively new, and she thinks that there were no American shrubs near it then, but of this she cannot be sure.

Aplozia cæspiticia.

Aplozia cæspiticia (Lindenb.) Dum. *Jungermannia cæspiticia* Lindenb. Syn. Hep. Eur. 67 (1829). *Dioicous. Small and tender.* In small dense patches or less commonly gregarious, *pale green to pale yellow-green* in colour. Stems *3–4·5 mm.* long, usually simple but frequently innovating from below the perianth, prostrate below, ascending to erect above; rhizoids long and colourless, numerous to apex of stem. Leaves obliquely inserted, imbricate, *erecto-appressed* and slightly concave *in the fertile plant*, rotund to subreniform, apex sometimes emarginate, the antical margin slightly decurrent; cells at middle of leaf 32–42 μ in diam., polygonal, *the walls very thin, trigones absent*, marginal row of cells quadrate with somewhat thickened walls, and forming a more or less distinct border; *cuticle smooth.* Under leaves absent. Involucral bracts larger than the leaves, embracing the perianth, the margin frequently sinuate; bracteole ovate to lanceolate, or absent. Perianth large, exserted half beyond the bracts, oblong-obovate, obtusely 4–5 plicate *in the upper part*, contracted into a small and shortly tubular, crenulate mouth. Capsule sphærical, reddish-purple, pedicel short. Spores 12–16 μ, pale red, nearly smooth. Elaters bispiral, reddish-purple. Male bracts in several pairs, transversely inserted, erecto-patent, rather smaller and more concave than the leaves, the antical margin frequently with a broad tooth; antheridia usually single, globose, pedicel very short. Gemmæ roundish-quadrate, more rarely 3-angled, 1-celled, very numerous in a *large and conspicuous, brownish-green, globular mass, closely invested with leaves, at the apex of the stem.*

Hab.—The Wilderness, Isle of Wight, *leg.* H. H. Knight, 23 Nov. 1908.

The leaves on the sterile and on the gemmiferous stems are erecto-patent, or sometimes even reflexed, at the apex, and they are less imbricated than in the fertile plant.

The Isle of Wight specimens belong to the male and gemmiferous plant which Rees described as var. *obtusata* in Eur. Leb. i. 320. In this state it cannot be confused with any other round-leaved species, the large gemmæ-balls being distinctive. Occasionally two of these balls occur on one stem. When gemmæ are absent the pale yellow-green colour of the plant, and the large and very thin-walled leaf-cells will distinguish it from most others. It is with *A. crenulata* that the plant is more likely to be confused

than any other, but that species has commonly a reddish tinge, the leaf-cells have thickened walls, the marginal row is 2–3 times larger than the next inner row, and forms a conspicuous border on at least some of the leaves; its var. *gracillima* has many innovations with small and distant leaves; in both the species and its variety the cuticle is minutely striate-verruculose, also one at least of the involucral bracts is generally adherent to the base of the perianth, and the perianth is sharply quadrangular almost to the base.

A. sphærocarpa is paroicous, and the leaf-cells have distinct trigones; it is also a larger plant, and frequently brownish.

Aplozia cæspiticia is everywhere rare. It is of the Continental, rather than of the western Continental, type of distribution. It has been found in the north-east of France, east part of Belgium, Denmark, south-east of Norway to Trondhjem (Kaalaas), Sweden, Finland as far north as Lapland, Germany, Switzerland, and the north of Austria. It has also been found in northern Alaska (Evans). It is generally confined to the low ground, and is stated to occur on various moist soils, including clay, chalk, gravel, and peat, at the side of ditches, fields, roadsides, and heathy places. It is more likely to inhabit the middle, south, and eastern parts of England than the west, but is not likely to be found anywhere except in small quantity, as in the Isle of Wight.

I sent a specimen of Mr. Knight's plant to Herr Stephani, who has confirmed the identification.

THE NOMENCLATURE OF ALGÆ.

Motion proposing an Additional Clause to the Rules of 1905, suggested for consideration of the Brussels Congress of 1910 by the Botanists of the British Museum, and others.

Art. 19 A.—The Nomenclature of Algæ begins with the *Systema Algarum* of C. A. Agardh (1824).

It is desirable to take as the starting-point for the Nomenclature of Algæ the *Systema Algarum* of C. A. Agardh (1824), which is the earliest trustworthy and comprehensive work of fixed and definite date. Agardh's works afford the first scientific basis for the study and classification of Algæ; moreover, his type-specimens are available for examination in his herbarium at Lund. His *Systema* is an epitome of his own works and views as well as of those of his predecessors, Turner, Lamouroux, and others. Upon his herbarium and writings was based the system of algology subsequently developed by his son, J. G. Agardh.

A. B. Rendle.
James Britten.
E. G. Baker.
A. & E. S. Gepp.
W. E. St. John Brooks.
William Fawcett.
Spencer Moore.
Annie Lorrain Smith.

SUPPLEMENTARY RECORDS OF BRITISH RUBI.

(April, 1900–December, 1908.)

By Rev. W. Moyle Rogers, F.L.S.

In Mr. Arthur Bennett's "Supplement to Topographical Botany, ed. 2," published with the 1905 volume of the *Journal of Botany*, the author writes: "*Rubus* is entirely omitted; the publication of the Rev. W. Moyle Rogers's *Handbook* is a new starting-point for British Rubi, and the appendix to that work may be consulted for comital distribution." Hence the apparent need for the following detailed list, which embodies a further account of *Rubus* distribution in Great Britain, as recorded from the date of the publication of my *Handbook*, April, 1900, up to the end of 1908.

Ireland has now its own *Topographical Botany*. All Irish records are therefore omitted from this list. They are, however, very numerous for the same period (1900–1908), and of great interest to British botanists, as showing how small is the number of British Rubi still unrecorded for the sister isle.

Where the record is based on my personal authority, the sign ! will be found after the name of the county. In other cases the same sign following the name of the recorder implies that I have seen dried specimens; while in the few instances where no such sign appears, either after county or recorder, there is (as I think) sufficient ground for accepting the record as accurate. Records enclosed in rectangular brackets are probably right, though for fully reliable determination further specimens seem desirable.

The nomenclature and sequence of species are those of the *London Catalogue*, ed. x.

The following abbreviations are used:—

Brit. Rubi = *British Rubi*. C. C. Babington. Van Voorst, 1869.
Flora = The latest published Flora of the county.
f. umbr. = forma umbrosa.
Hbk. Brit. Rub. = *Handbook of British Rubi*. Duckworth & Co., 1900.
J. Bot. = *Journal of Botany*.
Conf. = Confirmation of previous doubtful record.

Rubus idæus Linn.

1. Cornw. W. Ralfs.

Var. obtusifolius (Willd.).

23. Oxford. Druce.
48. Merioneth. Bagnall.
93. Aberd. N. J. Bot. 1902, 153!

R. fissus Lindl.

2. Cornw. E.! Briggs, Druce! (conf.)
13. Sussex W.! J. W. White! Marshall.
30. Beds. Druce!
41. Glam.! Ley! Riddelsdell!
51. Flint. Wolley-Dod!
53. Linc. S. Ley!
54. Linc. N. Ley! (conf.)
65. York N.W. Ley!
72. Dumfries. Bailey!
75. Ayr. Lindley.
89. Perth E. Flora.

92. Aberdeen S. Trail! (conf.)
96. Easterness. Baker.

R. SUBERECTUS Anders.

7. Wilts N. Record still wanting.
13. Sussex W. J. Bot. 1902, 153! 216.
21. Middlesex. H. Fisher!
54. Linc. N. Ley! (conf.)
65. York N.W. Webster! (conf.)

R. ROGERSII Linton.

[9. Dorset. Linton!]
10. Wight!
12. Hants N. Jackson!
[14. Sussex E.!]
41. Glamorgan. Riddelsdell!
50. Denbigh. Ley!
69. Westmoreland! Ley!
70. Cumberland. Druce!
75. Ayr!
76. Renfrew!
80. Roxburgh. Bailey!
92. Aberdeen S. Trail!
94. Banff. Trail!
97. Westerness. F. A. Rogers!
98. Argyle!
99. Dumbarton. Marshall!
100. Clyde I. (Bute). Marshall!
105. Ross W. C. E. Salmon!
107. Sutherl. E. Marshall!

R. SULCATUS Vest.

[23. Oxford. Druce!]
41. Glamorgan! Riddelsdell!
70. Cumberland! (conf.)

R. PLICATUS Wh. & N.

1. Cornw. W. Vigurs!
13. Sussex W.! (conf.). Marshall!
24. Bucks. Linton!
30. Beds. Druce!
31. Hunts. Ley!
41. Glamorgan! Riddelsdell!
53. Linc. S. Ley!
54. Linc. N. Ley!
60. Lanc. W. Wilson!
61. York S.E. H. J. Wilkinson!
64. York M.W. S. Gibson! (conf.)
65. York N.W. J. Dalton! (conf.)
69. Westmoreland! (conf.)
74. Wigton. F. A. Rogers! (conf.)
75. Ayr!
76. Renfrew!
94. Banff. Trail!
95. Elgin!

Var. BERTRAMII G. Braun.

13. Sussex W. Hilton!
41. Glamorgan. Riddelsdell!
69. Lanc. N. Ley!

Var. HEMISTEMON (Genev.?)

2. Cornw. E. Vigurs!
16. Kent W. Gilbert!
36. Hereford. Ley!
38. Warwick. Bagnall.
[44. Carmarthen. Ley!]
53. Linc. S. Ley!
54. Linc. N. Ley!

R. NITIDUS Wh. & N.

10. Wight!
13. Sussex W.! Marshall!
18. Essex S. C. E. Britton!
[21. Middlesex. Benbow!]
35. Monmouth. Ley (conf.).
55. Leicester. Bloxam! (conf.)
99. Dumbarton. Marshall!

Var. OPACUS (Focke).

1. Cornw. W. Vigurs!
2. Cornw. E. Druce!
11. Hants S.! Linton. J. F. Rayner!
17. Surrey. Britton! Wolley-Dod!
41. Glamorgan. Riddelsdell!
61. York S.E. Waddell!
69. Westmoreland. Ley!

R. AFFINIS Wh. & N.

25. Suffolk E. Hind! (conf.)
31. Hunts. Ley!
35. Monm. Spn. (collector?)

41. Glamorgan!
43. Radnor. Ley!
45. Pembroke. W. R. Linton!
49. Carnarvon. Bailey! (conf.)
54. Linc. N. Ley!

Var. BRIGGSIANUS Rogers.

1. Cornw. W.! Davey!
12. Hants N. Eyre!
48. Merioneth. Ley!
49. Carnarvon!

R. INTEGRIBASIS P. J. Muell.

6. Som. N. Linton! (conf.)
12. Hants N.!
17. Surrey! (conf.)

R. CARIENSIS Genev.

1. Cornw. W. Davey!
[2. Cornw. E. Druce!]
3. Devon S.!
45. Pembroke. Linton!

R. HOLERYTHROS Focke.

12. Hants N.!

R. LATIFOLIUS Bab.

1. Cornw. W.! Tresidder!
[91. Kincardine. Trail!]
[92. Aberdeen S. Trail!]

R. IMBRICATUS Hort. var. LONDINENSIS Rogers.

16. Kent W. C. E. Britton!
17. Surrey! C. E. Britton!
18. Essex S. C. E. Britton!

R. CASTRENSIS Wolley-Dod.

58. Chester. Wolley-Dod!

R. CARPINIFOLIUS Wh. & N.

5. Som. S. Murray! (conf.)
18. Essex S. C. E. Britton!
24. Bucks!
32. Northampton. Druce!
37. Worcester. Rec. wanting.
[41. Glamorgan. Linton!]
49. Carnarvon. Bailey.
53. Linc. S. Ley!
54. Linc. N. Ley!
58. Chester. Wolley-Dod!
61. York S.E. H. J. Wilkinson!
64. York M.W. Savery! A. E. Bradley!

R. INCURVATUS Bab.

1. Cornw. W.! Tresidder!
3. Devon S.!
21. Middlesex!
27. Norfolk E. Linton!
41. Glam.! Riddelsdell! Ley!
55. Leicester. Jackson and Routh! Horwood!
56. Notts. Carr!
[64. York M.W.! G. B. Savery!]
65. York N.W.!

R. LINDLEIANUS Lees.

1. Cornw. W.! F. A. Rogers!
14. Sussex E. Farr!
30. Beds!
75. Ayr!
98. Argyle! (conf.) Brit. Rubi.

R. ARGENTEUS Wh. & N. (*R. erythrinus* Genev. Hbk. Brit. Rubi.)

1. Cornw. W.! F. A. Rogers! L. A. M. Riley!
13. Sussex W.! Hilton!
45. Pemb. Linton! Bickham!
48. Merioneth. W. Bell!
53. Linc. S. Ley!
56. Notts. Carr!

R. DURESCENS W. R. Linton.

55. Leic.! Jackson & Routh!

R. RHAMNIFOLIUS Wh. & N.

20. Herts. Linton!
30. Beds! Druce!
43. Radnor!
75. Ayr!
100. Clyde Isles!

Var. BAKERI (F. A. Lees).

3. Devon S. Druce!
37. Worcester. Gilbert!
41. Glamorgan. Riddelsdell!
f. *elongata*.

51. Flint. Wheldon!
57. Derby. W. R. Linton!
60. Lanc. W. A. Wilson!
63. York S.W. W. B. Crump!
69. Lanc. S. Ley & Linton! Oliver!

R. NEMORALIS P. J. Muell.

17. Surrey! C. E. Britton!
23. Oxford. Druce!
37. Worcester. Gilbert!
41. Glamorgan! Ley!
65. York N.W.!
70. Cumberland!

Var. GLABRATUS Bab.

17. Surrey. Babington.
40. Salop. Babington.
58. Chester. Babington.

Var. SILURUM Ley.

6. Som. N. Flora, 102, 414.

R. SCHEUTZII Lindeb.

11. Hants S. H. Fisher!
17. Surrey. C. E. Britton!
23. Oxford. Druce!
44. Carmarthen. Ley!
54. Linc. N. Ley!
58. Chester. Wolley-Dod! forma.
70. Cumb.! Druce! Standen!
73. Kirkcudbright. Bailey!
75. Ayr!
76. Renfrew!
98. Argyle. F. A. Rogers!

R. DUMNONIENSIS Bab.

10. Wight. Stratton!
16. Kent W.! (conf.)
17. Surrey. C. E. Salmon! R. A. Rolfe! (conf.)
18. Essex E. C. E. Britton!
38. Warwick. Jackson!
41. Glam. J. Bot. 1906, 93!
[69. Westmoreland!]
100. Clyde I. (Bute). Marshall!
103. Ebudes M. (Mull and Coll). Macvicar!
106. Ross E. Recorder?

R. PULCHERRIMUS Neum.

1. Cornw. W.! F. A. Rogers! Druce!
19. Essex N. W. Whitwell!
31. Hunts. Ley!
32. Northants. Druce!
45. Pembroke. Linton!
53. Linc. S. Ley!
64. York M.W. Fisher and Wilkinson!
75. Ayr!
76. Renfrew!

R. LINDEBERGII P. J. Muell.

53. Linc. S. Ley!
54. Linc. N. Ley!
69. Westm. & Lanc. N.! Oliver!
75. Ayr. F. A. Rogers!

R. LACUSTRIS Rogers.

69. Westmoreland & Lanc. N.! Standen!
70. Cumberland!

R. MERCICUS Bagnall.

36. Hereford. Ley!
46. Cardigan. Marshall!
53. Linc. S. Ley!
54. Linc. N. Ley!
63. York S.W. W. B. Crump!

Var. BRACTEATUS Bagnall.

12. Hants N. W. L. W. Eyre!
13. Sussex W. J. W. White!
17. Surrey. White!
34. Gloster W. White!
41. Glamorgan! Riddelsdell
49. Carnarvon. Murray!
53. Linc. S. Ley!
64. York M.W. Bradley!
70. Cumberland!

Var. CHRYSOXYLON Rogers.

3. Devon S. G. B. Savery!
36. Hereford. Ley!
42. Brecon! Ley!

R. VILLICAULIS Kochl.

7. Wilts N. Marshall!

41. Glamorgan. Ley!
48. Merioneth. Ley!
54. Linc. N. Ley! (conf,)
93. Aberdeen N. Trail!
105. Ross W. C. E. Salmon!

Var. CALVATUS Blox.

13. Sussex W.!
24. Bucks. Druce! (conf.)
54. Linc. N. Ley!
61. York S.E. Wilkinson!

R. SELMERI Lindeb.

1. Cornw. W.!
10. Wight!
13. Sussex W. Marshall and C. E. Salmon!
17. Surrey! C. E. Britton!
[24. Bucks. Druce!]
25. Suffolk E. Hind!
31. Hunts. Ley!
45. Pembroke. Ley! Linton!
53. Linc. S. Ley!
54. Linc. N. Ley!
61. York S.E. Wilkinson!
64. York M.W. Fisher! (conf.)
65. York N.W.! (conf.)
71. Man. Waddell!
72. Dumfries. Mrs. Slater!
73. Kirkcudbright. Bailey!
75. Ayr!
76. Renfrew!
77. Lanark. Waddell! (conf.)
95. Elgin. Druce (conf.)
104. Ebudes N.E. Macvicar!
106. Ross E. Marshall and Shoolbred! (conf.)

R. RHOMBIFOLIUS Weihe.

13. Sussex W. J. W. White!
16. Kent W.! (conf.) Wolley-Dod!
21. Middlesex!
24. Bucks. Benbow! Druce!
42. Brecon. Ley!
53. Linc. S. Ley!

Var. MEGASTACHYS Wolley-Dod.

17. Surrey. Wolley-Dod!

R. GRATUS Focke.

1. Cornw. W. Davey!
14. Sussex E. Farr!
30. Beds. Druce!
58. Chester. Wolley-Dod!

Var. SCIAPHILUS Lange.

17. Surrey. A. B. Jackson!
34. Gloster W. Ley!
35. Monmouth. Ley!
36. Hereford. Ley!
37. Worcester. Waddell!
42. Brecon. Ley!
46. Cardigan. Marshall!

R. LEUCANDRUS Focke.

5. Som. S. Certain record wanting.
8. Wilts S. Marshall!
10. Wight!
13. Sussex W.!

R. RAMOSUS Briggs.

17. Surrey. C. E. Britton! forma.
[34. Gloster W. St. Brody!]
[70. Cumb. Mrs. R. A. Allison!]

R. THYRSOIDEUS Wimm.

[1. Cornw. W.! f. or var.]
2. Cornw. E. Bucknall!
10. Wight! (conf.)
12. Hants N. Townsend! (conf.). Eyre!
13. Sussex W. Roper!
14. Sussex E.! Roper! Farr!
19. Essex N. Bloxam, herb. Syme!
23. Oxford. F. A. Rogers! Druce!
30. Beds. Druce!
33. Gloster E. Riddelsdell!
[34. Gloster W. St. Brody!]
[45. Pembroke. Ley! f. or var.]
54. Linc. N. Ley!
61. York S.E. C. Waterfall!

R. GODRONI Lecoq & Lamotte. (*R. argentatus* P. J. Muell. Hbk. Brit. Rubi.)

1. Cornw. W.! L. A. M. Riley!
2. Cornw. E. L. A. M. Riley!
3. Devon S.!
45. Pembroke. Ley!
46. Cardigan. Marshall!

Var. ROBUSTUS (P. J. Muell.).

1. Cornw. W. F. A. Rogers!
[3. Devon S. G. B. Savery!]
10. Wight!
12. Hants N. F. A. Rogers!
14. Sussex E.! Hilton!
34. Gloster W. Ley! White and Fry!
41. Glamorgan! Riddelsdell!
43. Radnor!
63. York S.W. H. H. Corbett!
64. York M.W. Fisher!
65. York N.W.!

Var. CLIVICOLA Ley.

17. Surrey!
34. Gloster W. Ley!
40. Salop. Ley.
57. Derby. T. E. Routh! forma.

Var. FOLIOLATUS Rogers & Ley.

3. Devon S. G. B. Savery!
41. Glam.! Ley! Riddelsdell!
42. Brecon. Ley!
58. Chester. Wolley-Dod!
64. York M.W.! A. E. Bradley!
[65. York N.W.!]

R. RUSTICANUS Merc.

20. Herts. Riddelsdell.
74. Wigton. F. A. Rogers!

R. PUBESCENS Weihe.

13. Sussex W. J. W. White.
24. Bucks. Druce! (conf.)
27. Norfolk E. Linton! (conf.)
41. Glamorgan! Riddelsdell!
57. Derby. W. R. Linton!

Var. SUBINERMIS Rogers.

18. Essex S. C. E. Britton!
32. Northampton. Jackson!
58. Chester. Wolley-Dod!
98. Argyle (Colonsay Isle). M. M. Neill! forma.

R. SILVATICUS Wh. & N.

1. Cornw. W. Vigurs! Davey.
5. Som. S. Murray! (conf.)
12. Hants N. Eyre!
16. Kent W.!
23. Oxford. Druce!
30. Beds!
34. Gloster W. Ley!
46. Cardigan. Marshall! (conf.)
53. Linc. S. Ley!
54. Linc. N. Ley!
58. Chester. Wolley-Dod!
64. York M.W. G. B. Savery!
[70. Cumberland. Druce!]

R. MYRICÆ Focke var. HESPERIUS Rogers.

[15. Kent W.! Forma.]
[49. Carnarvon. Ley! forma.]

R. LENTIGINOSUS Lees.

[1. Cornw. W. Davey.]
12. Hants N. Townsend!
13. Sussex W.! Linton and Marshall!
14. Sussex E.! Hilton!
16. Kent W.! (conf.) C. E. Britton!
18. Essex S. C. E. Britton!
34. Gloster W. Ley!
39. Staffs. Bagnall.
40. Salop. Certain rec. wanting.
48. Merioneth. Ley!

R. MACROPHYLLUS Wh. & N.

1. Cornw. W. F. A. Rogers! Davey! Tresidder!
13. Sussex W.! J. W. White.
19. Essex N. C. E. Britton!
44. Carmarthen. Ley!
50. Denbigh. Ley!
53. Linc. S. Ley!
58. Chester. Wolley-Dod! (conf.)
60. Lanc. W. Wheldon!
76. Renfrew!

Var. SCHLECHTENDALII (Weihe).

1. Cornw. W. Davey!
16. Kent W.!

19. Essex N. C. E. Britton!
23. Oxford. F. A. Rogers! Druce!
45. Pembroke. W. R. Linton!
53. Linc. S. Ley!
[61. York S.E. Wilkinson!]
64. York M.W. Fisher!
74. Wigton. F. A. Rogers!

Var. MACROPHYLLOIDES (Genev.).

1. Cornw. W. Davey!
2. Cornw. E. Record wanting.
3. Devon S.! G. B. Savery!
13. Sussex W.!
21. Middlesex. Jackson!
41. Glam. Riddelsdell! f. umbr.
48. Merioneth. Ley! forma.
50. Denbigh. Ley!
58. Chester. Wheldon!
98. Argyle. F. A. Rogers!

Var. AMPLIFICATUS (Lees).

11. Hants S.!
23. Oxford. Druce!
41. Glamorgan! Riddelsdell!
42. Brecon. Ley!

R. AMPHICHLOROS P. J. Muell.

[36. Hereford. Ley!]

R. QUESTIERII Lefv. & Muell.

12. Hants N. Eyre!
36. Hereford. Ley! (conf.)
[56. Notts. Carr!]

R. SALTERI Bab.

13. Sussex W.!
14. Sussex E.!
24. Bucks!
30. Beds! Druce!
34. Gloster W. St. Brody! Ley!
41. Glamorgan, Ley and Riddelsdell! Trow!
[57. Derby. W. R. Linton!]

R. COLEMANNI Blox.

11. Hants S. J. Groves! (conf.)
12. Hants N.!
16. Kent W. D. C. O. Adams!
31. Hunts. Ley!
34. Gloster W. Ley!
36. Hereford. Ley!
62. York N.E. Bickham!
63. York S.W. A. E. Bradley!

R. SPRENGELII Weihe.

61. York S.E. Waddell!
71. Man, Waddell!

R. ORTHOCLADOS Ley.

34. Gloster W.!
37. Worcester. Gilbert!
46. Cardigan. Painter! forma.
[48. Merioneth. Ley!]
[58. Chester. Wolley-Dod!]

R. HYPOLEUCUS Lefv. & Muell.
(*R. micans* Gren. & Godr. Hbk. Brit. Rubi.)

11. Hants S. Townsend! (conf.)
12. Hants N.!
27. Norfolk E. Linton.
34. Gloster W. Bucknall!
41. Glam.! Ley & Riddelsdell!
45. Pembroke. Ley! Linton!
46. Cardigan. Painter!
52. Anglesea. Griffith!
58. Chester. Wolley-Dod! (conf.) Bailey!
65. York N.W.!

R. HIRTIFOLIUS Muell. & Wirtg.

3. Devon S. Savery! forma.
14. Sussex E. Farr!
[23. Oxford. Druce!]
46. Cardigan. Painter!
57. Derby. W. R. Linton!
68. Cheviotland. F. A. Rogers! (conf.)
88. Perth M.! (conf.) Flora.

Var. DANICUS (Focke).

10. Wight. Townsend!
12. Hants N. Eyre! f. umbr.
22. Berks. Marshall!
41. Glamorgan. Riddelsdell!
58. Chester. Wolley-Dod! forma.
69. Westmoreland. Ley!
99. Dumbarton, Marshall!

Var. MOLLISSIMUS Rogers.

1. Cornw. W. Davey!
2. Cornw. E. L. A. M. Riley!
10. Wight!
14. Sussex E. Hilton!
22. Berks. Jackson!
28. Norfolk W. Jackson!
35. Monmouth. Ley!
41. Glamorgan. Riddelsdell!
[46. Cardigan. Painter!]
48. Merioneth. T. E. Routh!
forma.

R. IRICUS Rogers.

1. Cornw. W.! W. Tresidder!
41. Glamorgan! Riddelsdell!
42. Brecon. Ley! forma.
44. Carmarthen. Ley!
46. Cardigan. Painter!

R. PYRAMIDALIS Kalt.

1. Cornw. W.! F. A. Rogers!
2. Cornw. E. L. A. M. Riley!
10. Wight. Townsend!
13. Sussex W.!
21. Middlesex!
23. Oxford. Druce!
25. Suffolk E. Hind!
45. Pembroke. Ley! Linton.
51. Flint. Wolley-Dod! (conf.)
59. Lanc. S. Moss!
60. Lanc. W. Wheldon!
61. York S.E. Waddell!
64. York M.W. G. B. Savery!
65. York N.W.!
70. Cumberland! Mrs. Allison!
71. Man. Waddell!
74. Wigton. F. A. Rogers!
75. Ayr!
97. Westerness. Druce!
98. Argyle!
100. Clyde I.! (Bute).
104. Ebudes N. Druce!

R. LEUCOSTACHYS Sm.

28. Norfolk W. Linton.
61. York S.E. Wilkinson!

Var. GYMNOSTACHYS (Genev.).

3. Devon S.! G. B. Savery!
16. Kent W. Gilbert!
17. Surrey!
41. Glamorgan. Riddelsdell!
48. Merioneth. W. Bell!
64. York M.W. Bradley!

Var. LEUCANTHEMUS P. J. Muell.?

14. Suss. E. Gilbert! Waddell!
16. Kent W. Gilbert!
36. Hereford. Ley!
41. Glam. Ley! Riddelsdell!
69. Westmoreland!

R. LASIOCLADOS Focke.

36. Hereford. Ley!
37. Worcester. Gilbert!
40. Salop. Ley!

Var. ANGUSTIFOLIUS Rogers.

1. Cornwall W.!
3. Devon S.!
10. Wight!
13. Sussex W.!

Var. LONGUS Rogers & Ley.

41. Glam.! Ley! Riddelsdell!
42. Brecon. Ley!

R. CRINIGER Linton.

5. Som. S. Murray!
12. Hants N. Townsend! Eyre!
17. Surrey. C. E. Britton!
24. Bucks. C. E. Britton!
41. Glamorgan. Riddelsdell! forma.
58. Chester. Wolley-Dod! (conf.)
60. Lanc. W. Wheldon and Wilson!
69. Lanc. N. Ley!

R. ADENANTHUS Boul. & Gill.

[12. Hants N. Eyre! forma.]
36. Hereford. Ley!
41. Glamorgan. Riddelsdell!
58. Chester. Wolley-Dod!

R. BORÆANUS Genev.

1. Cornw. W. Davey! f. umbr.
12. Hants N. Townsend!

34. Gloster W. Ley! f. umbr.
35. Monmouth. Ley!
36. Hereford. Ley!

R. CINEROSUS Rogers.

[3. Devon S. G. B. Savery!]
37. Worcester. Ley!
40. Salop. Ley!
41. Glamorgan. Riddelsdell! forma.
42. Brecon. Ley!
55. Leicester!
58. Chester. Wolley-Dod!
60. Lanc. W. Wheldon!
98. Argyle. Marshall!

R. MUCRONATUS Blox.

8. Wilts S.! Tatum!
23. Oxford. Druce! (conf.)
24. Bucks. Benbow! Druce!
48. Merioneth. Ley!
53. Linc. S. Ley!
59. Lanc. S. Wheldon!
60. Lanc. W. Wheldon and Wilson!
61. York S.E. Wilkinson!
65. York N.W. F. A. Lees! H. S. Thompson!
94. Banff. Trail!

Var. NUDICAULIS Rogers.

10. Wight! (conf.)

R. MUCRONATOIDES Ley.

36. Hereford. Ley! (J. Bot. 1907, 447).
41. Glam. Riddelsdell! forma.
43. Radnor! Ley!
96. Easterness. Marshall!
106. Ross E. Marshall!

R. GELERTII Frider.

[3. Devon S. G. B. Savery!]
6. Som. N. Ley! forma.
13. Sussex W. Hilton!
16. Kent W. Gilbert!
27. Norfolk E. Linton! forma.
36. Hereford. Ley! (conf.)
41. Glam. Riddelsdell! Trow!
42. Brecon. Ley! forma.
55. Leicester. Linton! (conf.)
[60. Lanc. W. Wheldon!]

R. LETTII Rogers.

1. Cornw. W. Davey! Tresidder! forma.
36. Hereford. Ley! forma.
46. Cardigan. Painter! forma.

(To be concluded.)

COMITAL CENSUS NUMBERS.

By G. Claridge Druce, M.A., F.L.S.

I HAVE been pressed by some of my friends—the Editor of this Journal among them—to send a note on the statement made in the review (which contains much debatable matter) of my *List of British Plants* in this Journal for 1908, p. 129:—"Another point on which we fear Mr. Druce's List is open to adverse criticism is that of distribution. A comparison with the new edition of the *London Catalogue* shows serious divergences throughout." I let the judgement go by default, as I had no wish to say others were incorrect, being aware that anyone who knew or who studied the question would be able to decide upon the general accuracy of my List. With the exception of a few misprints, due chiefly to "typing," e. g. *Trifolium suffocatum*, 13 not 19, *Jasione*, 84 not 90, *Fumaria capreolata*, 40 not 46, and the possible correction of two critical *Fumariæ*, &c., I am prepared to prove the general accuracy

of my figures. Of course I do not say that every record in *Top. Bot.* or its *Supplement* is correct; we know that many are inaccurate or doubtful, but for these, when known to me, I have made due allowance, and the records which are in doubt are in most cases, where space allowed, put in brackets.

It would be almost impossible for lists compiled independently by two botanists to agree; the material in possession of each would be different; each would probably have a different standard of the limitation of species; and in other ways variations would be shown. This is especially the case with critical genera, but if my figures for *Fumaria Bastardi* (*confusa*), 48, and *F. muralis*, which I queried at 20, were over-estimated, what about the numbers in *Top. Bot.* and its *Supplement* by Bennett? *F. confusa* has 24 counties (using this word as including vice-counties) in the former work, and Bennett adds 32 = 56; *F. muralis* in *Top. Bot.* has 18, and Bennett gives 12 others = 30, these being reduced in *Lond. Cat.* to 31 and 6 respectively! This example may show how the notions of critical species vary from time to time, while it also demonstrates the difficulty of the task for the compiler of such numbers. *Thalictrum minus* may also be instanced. Watson included under this name *T. majus*, while he kept *T. montanum* distinct; whereas I keep *majus* distinct, uniting *montanum* with *T. minus* L. agg. This being a critical plant, I only quoted the counties whence I had myself seen specimens, *i. e.* 32, but I put a query to the figures, as I felt certain the number was an underestimate. Other difficulties arise with plants which are denizens or doubtful natives, or those which, while native species in the south, are alien in the north of Britain; and these offer examples where considerable divergence may be caused.

If the reader will add the number of the county records in Bennett's *Additions* to those already recorded in *Top. Bot.* he will often find the result different from the number in *Lond. Cat.*, even if the duplication of the records, which is by no means uncommon, be allowed for. As an instance may be cited *Ranunculus Lingua*. *Top. Bot.* has 77 (five of these I delete as queried, *i. e.* Devon N., Som. S., Middlesex, Notts, and Kirkcudbright), leaving 72. Bennett gives eight additions, but 25. Suffolk E., 72. Dumfries, and 57. Derby (the latter queried in *Top. Bot.*) are already recorded in *Top. Bot.*, so that if we add 72 to 5 = 77. To these I add Stirling (*Ann. Scott. Nat. Hist.* (1898) p. 43), W. Ross (*Davidson*), Caithness (*Hb. Druce, plentiful near Loch Scarmclett*!) = 80. Space will not allow of giving many instances, although they readily present themselves, but we may also explain some considerable divergences; for instance, take

Polygala vulgaris		*Myrioph. alterniflorum*		*Carum verticillatum*	
Top. Bot.	35		57		19
Bennett	52		28		5
Add	16		6		3
(L. C. 83)	103 − 6 = 97	(L. C. 80)	91	(L. C. 20)	27

But in the case of *Polygala vulgaris* we have to deduct six from Mr. Bennett's *Additions*, since 14 Sussex E., 15 Kent E., 17 Surrey, 49 Carnarv., 66 Durham, and 88 Perth M. are already in *Top. Bot.* My additions are 11 (*Flora*), 18!; 19 (*Vict. Co. Hist.*), 39 (*Flora*) 50! 51!, 60 (*Flora*); 71 (*Hiern*), 77 (*A. S. N. H.* (1898) 103), 78! 80!, 81 (*Evans*), 86 (*A. S. N. H.* (1898) 100), 87 (*Journ. Bot.* (1882), 81!), 91!, and 100 (*A. S. N. H.* (1898), 100) = 16. It is only fair to say that Mr. Bennett's *Additions* are only up to the end of 1903, so that the results of four years' work have to be allowed for. On the contrary, there are some instances in which my *List* shows fewer numbers than in the *Lond. Cat.*, e. g. *Briza media* L. (which may eventually be found in more counties) in my *List* has 102, *Lond. Cat.* 111.

Top. Bot.	English counties . . .	59
	Welsh and Scottish . . .	35
	Bennett	4
		98

To these I add 42 Brecon (*Journ. Bot.* (1885), 147), 74 Wigton! 97 Westerness (*A. S. N. H.* (1900), 39) = 102, 99 Dumbarton (*Trail*, l. c. (1907) 227) = 102. Probably 101 [1] would have been the more correct way of putting it, as in Orkney it is perhaps only casual.

With recently separated segregates the numbers are doubtless below that of their real distribution, and even with well known species records are constantly coming in, so that the figures in any list must be more or less provisional. My object was to give an idea of the distribution of the plant through Britain, and the compilation took more time and labour than would be realized. I cannot hope to have included all published records, but my thirty years' field work in all the British counties and a fairly exhaustive study of British botanical literature (the results of which are duly entered in my copy of *Top. Bot.*) enabled me to give what I believe to be a more complete and accurate comital census of British plants than has hitherto been published.

The comital numbers for Ireland are practically those of the valuable Irish *Top. Bot.*, and its additions by Mr. Praeger, and I take this opportunity of acknowledging them.

HEREDITY OF ACQUIRED CHARACTERS.

By the Rev. E. A. Woodruffe-Peacock, F.L.S.

In 1896 I went late in the spring with a farmer to place some sheep in a seed-pasture or temporary lea. The field lies on the bank of the canalled river Ancholme, and is, as regards soil, shallow peat with a wide line of Oxford Clay, &c., along the new cutting. The flora was the ordinary local mixture of *Lolium perenne*, *L. multiflorum*, with here and there a plant of the true

L. italicum and a mixture of Trifoliums. On the peat the plant was very thick, and there was "no room for weeds," but on the clay it "has missed badly," and its place was taken by a fairly thick growth of *Taraxacum officinale*. The pasture had not been stocked for some time, and the flower-stalks of the *Taraxacum* showed their usual upright growth. The following evening the golden glory had departed, and all the *Taraxacum* plants were eaten fairly closely off. Less than a fortnight later they had recovered as a rule, and were in full flower again, for the sheep by that time had become accustomed to a full supply. What a change in their method of growth had come over the same plants in so short a time! Instead of the usual upright growth of the typical plant, the flowers were all laid on the ground "as snug as thieves," as the farmer said when I pointed it out to him. In many cases the peduncles were long and rested wholly on the ground, with the flowering head merely turning up to the sun. This observation set me thinking and recording the habit of seed pasture weeds.

The heredity of acquired characters I find to be most difficult of proof, for it is no child's play to distinguish between acquired or individual characters and specific or heritable ones. The same gift that I have illustrated by *Taraxacum* is found in other seed-pasture weeds. The upright-growing *Geranium dissectum* is well known, but in seed-fields especially, and in other places where it is freely eaten by close-grazing stock such as sheep and goats, the "weeping" or "rosette" form is the prevailing one. The branches bend down to the soil at once and lie on it in a circle round the tap-root; the flowers showing among the leaves, not above them. The same may be said of *G. molle*, which in a most curious way varies in flower-colour too, apparently, at least in some cases, according to situation.

Another plant which varies the form of its growth when found in seed-pastures is *Caucalis nodosa*. The rosette form is common enough. *Alchemilla arvensis*, in sheep pasture, is the same. On downs, too, where sheep bite very closely, *Festuca ovina* takes on a ball-like or rosette form.

Now why are these states so patent in temporary grazing mixtures? Because the plants referred to are highly adaptable, as shown in the first instance by *Taraxacum*. I do not deny it, but reply:—That only answers the question for pastures which are closely grazed. There are others which are sown in the same way for winter fodder and to be threshed as seeds for future crops. These remain unstocked always. In them also both forms of *G. dissectum* and *G. molle* may be found. This looks like a true case of heredity—of acquired characters—for temporary leas have come into existence in England within the memory of the oldest members of the passing generation.

[A similar phenomenon may be noticed in *Plantago major*, which on a frequently mown lawn produces flower-stalks which bend down and spread just as those of *Taraxacum* are described as doing.—Ed. Journ. Bot.]

BIBLIOGRAPHICAL NOTES.

XLVI.—"Nomenclator Garsaultianus."

Under this title Thellung (in Bull. Herb. Boiss. sér. 2, viii. 713, 1908) puts forward M. de Garsault's *Figures des Plantes* 1764 and *Description*, &c., 1767 as authoritative for certain names which he claims as binominals, one at least of which—*Centaurium majus*—is taken up in the new edition of Schinz & Keller's *Flora der Schweiz*. We cannot allow that these names have any claim to recognition in modern botanical nomenclature. As Dr. Thellung himself shows, more than half are uninominal or multinominal—the exact figures are (*fide* Thellung) binominal 336, uninominal 282, polynominal 71—and this clearly indicates that Garsault himself intended to use no system, binominal or otherwise. The careful correlation which Dr. Thellung has published later (*op. cit.* 778) of Garsault's names with those used by Linnæus demonstrates that Garsault had no knowledge or at any rate made no use of Linnæus's works. A comparison of Garsault's volumes with Geoffroy's work *Tractatus de Materia Medica* (Tom. ii. *de vegetabilibus exoticis*, and Tom. iii. *de vegetabilibus indeginis*), Paris, 1741, shows that he merely adopted the names previously used by Geoffroy, who himself employed the then commonly accepted officinal nomenclature. An illustration of this is found in *Centaurium*, under which heading Garsault, following Geoffroy, has two species, *C. majus* (= *Centaurea Centaurium* L.) and *C. minus* (= *Gentiana Centaurium* L.). If he had not merely been following Geoffroy he would surely have noticed the incongruity of associating two plants which had been distinguished as different genera by Linnæus thirty years before. Garsault's work must, as his preface shows, be accepted merely as a companion to Geoffroy; he makes no reference to any botanical work nor is there evidence that he ever consulted any. His figures are excellent, but the account which Larousse gives of him shows him to have been a clever writer upon very various subjects, none of which except the work under consideration have any connection with natural science.

It is absurd to attempt a parallel, as Dr. Thellung does, between the nomenclature of Miller's *Gardeners Dictionary*, ed. viii., and that of Garsault. In this edition Miller, as he says in his preface, entirely followed Linnæus's method; his nomenclature is that of Linnæus, except for additions which also follow the binominal system.

James Britten.
A. B. Rendle.

SHORT NOTES.

Orchis ericetorum Lint. = O. maculata præcox Webster.—In this Journal for 1907 (p. 344) the Rev. E. F. Linton has drawn attention to the difference in the flowering period between the

above plant and ordinary *O. maculata*, the former being, he says, nearly a month earlier than the latter. This is, however, not a new fact, but one on which the earliest describer laid especial stress. This description, which appears to have escaped notice, will be found in Mr. A. D. Webster's *British Orchids*, p. 54 (1886), where it is stated that "the article under the heading of 'An Unnamed British Orchid' and accompanied by living specimens of the plant, was read before the Botanical Society of Edinburgh on June 10, 1886,* but as Prof. Dickson considers the plant as a variety of *O. maculata* it is now included as such, although my own convictions, based on the above description, are certainly strongly in favour of its being regarded as a new and distinct species." Mr. Webster then gives the following full and accurate description of the plant under the name "*O. maculata præcox* Webster. Tubers palmate, smaller and more deeply divided than in *O. maculata*. Stem 4–7 inches in height with narrow lanceolate leaves at the base, the upper portion being thickly beset with long linear bracts. Leaves at the base 2½ inches long by 1 inch broad, stem clasping, and usually spotted. Flower-spike large in proportion to the plant's size, 2–3 inches in length, usually dense and conical in shape, and varying in colour from a bright pinky-purple to nearly white. Sepals equal in size, also the same length but not so broad as the two inner petals, none of these surpassing the lip in length. Two outer sepals always the same colour and marked like the lip. Two petals and upper sepal forming a hood-like protection to the column. Lip wide in proportion to the flower's size, three-parted, the middle lobe small, angular, and hardly an eighth-part the size of the lip, the whole marked with lines and spots. Spur horizontal with the ovary, the same length or shorter, cylindrical, and pointed at the apex. Bracts linear, acute, and exceeding the flowers in length." This excellent description is followed by an equally accurate account of the habitat, and of the differences between this plant and *O. maculata*. I have hitherto considered it to be a soil variation of *O. maculata*; the latter is not restricted, as has been said, to calcareous soils, for I have recently seen both forms growing on Chailey Common —*maculata* in the more clayey, *præcox* in the peaty and better drained portion. Comparative culture has yet to be tried upon these plants, which may prove to be specifically distinct. In Carnarvonshire and Denbigh I can confirm Mr. Webster's remarks as to time of flowering. In Durham and North-west Yorks the time of flowering of the two plants becomes more approximate, for at Middleton, in Teesdale, I saw both in flower, although not growing with each other, *maculata* being more lowland and occurring in stiff soil. I did not see true *maculata* on the moors. If the latter is regarded as a variety of the former, Mr. Webster's name *præcox* should be used.—G. Claridge Druce.

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* [There is no reference to the paper in Trans. Bot. Soc. Edinb.—Ed. Journ. Bot.]

CLADONIA LUTEOALBA.—This new species is thus described by Messrs. Albert Wilson and J. A. Wheldon (who have found it in various localities in Lancashire and Westmorland) in the *Transactions of the Liverpool Botanical Society*, i. 7:—

"Thallus macrophylline, lobes 5–10 mm. long, irregularly crenate, yellowish green above (becoming blackish-green with age), pallido-sulphureous beneath, their apices and sometimes their lateral margins strongly incurved when dry (as in *C. alcicornis*) showing the pulverulent under-surface, and rendering the leaflets concave. Podetia rare, only once seen, short (3–5 mm.) cylindrical, from the surface of the leaflets, scyphiferous, scyphi hardly dilated, bearing small marginal discrete scarlet apothecia. The chemical reactions of the upper surface are indistinct (K f C —). The yellow colour of the under surface becomes much deeper on applying K HO, and the immediate application of Ca Cl $\frac{=}{2}$ still further intensifies it until it is of a deep orange-yellow."

ULMUS GLABRA Huds.—In Shropshire the unusual prodigality of fructification in the case of the wych elm is this year exciting much comment. I do not know whether in other counties the immense profusion of seeds, mostly perfectly matured, at this time falling like snowflakes, or, with better similitude, chaff, and strewing the ground as leaves in autumn, is as marked a circumstance as it is here. Several trees I have observed as well-nigh leafless, the whole strength having gone towards seed-bearing. It is to be hoped that their vitality may not be impaired thereby. I should be glad to know if the experience of this year in this respect is not extremely unusual, and, indeed, abnormal. The common elm (*U. campestris*) has fruited here, perhaps, more luxuriantly than usual, but nothing to the same extent as its congener, *U. glabra*.—J. COSMO MELVILL.

SHROPSHIRE HEPATICÆ.—During a short visit to Church Stretton at Eastertide this year I noted a few species of hepatics which I find are not included in the interesting list of Shropshire hepatics given by Mr. W. P. Hamilton in the *Victoria History of Shropshire*, p. 78, vol. i. 1908; and I therefore put them on record in case they have not been previously noted. They are:—*Aneura pinguis* and *Lophozia bantriensis*, Carding Mill Valley; *Plagiochila spinulosa*, Ashes Valley; and *Madotheca rivularis*, Light Spout, Carding Mill Valley. The last-mentioned species was associated with *M. lævigata* and *Metzgeria conjugata*, which are already on record for Shropshire.—W. G. TRAVIS.

ERIOPHORUM ANGUSTIFOLIUM Roth var. VULGARE Koch.—This was found by Mr. A. B. Jackson in May, 1908, in two wet meadows, Moor Hall, Harefield, 100–200 yards from the bridge over the Colne connecting Middlesex and Bucks, which there form the south extremity of Harefield Moor, bordered by the Colne backwater. This is now the only spot in Middlesex where the plant is known to occur; it has not been verified at the Hare-

field station since Blackstone's time (1737), until Mr. Jackson noticed it. As it occurs nowhere else in the Harefield district, this exact locality is very probably Blackstone's "locus classicus," and it is there very abundant and in patches of considerable size.—F. N. WILLIAMS.

REVIEWS.

Mendel's Principles of Heredity. By W. BATESON, M.A., F.R.S. Crown 8vo, pp. 396. Three portraits, six coloured plates, and thirty-three figures. Price 12*s.* net. Cambridge University Press. 1909.

"THE object of this book is to give a succinct account of discoveries in regard to Heredity made by the application of Mendel's method of research." Such is the author's definite statement in the preface; and his intentions have been amply carried out and the object fully attained in this handsome volume. A brief summary of the subject was published by the author just seven years ago, and was noticed in this Journal for 1902, p. 329. It was written to repel a somewhat weak attack on the principles of Heredity in general and on Mendelism in particular on the part of the late Professor Weldon. This preliminary excursus was almost at once sold out, and having served its purpose was not reprinted. The present work is the most complete treatise on the Mendelian aspect of Heredity which has yet appeared in English; and, like so much of the work of the Cambridge Biological School, is not only far more lucid in its treatment of the subject but less dogmatic in its deductions than the laborious memoirs on similar and cognate subjects which seek to find favour in Germany.

The scientific public have for many years been familiar with Francis Galton's researches into the problems of heredity, and have long been interested in the attempted unravelling of the tangled threads which obscure the practical study of Eugenics. It is therefore of interest to ascertain to what extent Mendelian inquiries assist the interpretation of the data of heredity, and whether by such methods we reach reality and concrete fact among phenomena that had become almost proverbial for their irregularity. It is now becoming to be admitted that the key to the problems of Eugenics, and, as a corollary to this, to that of species also, lies in the recognition of the character-units, or *factors* as they have been called. An important question then is, What are the distinctive features of Mendelian inheritance which differentiate the cases exhibiting it from those to which Francis Galton's system of calculation—or any other system based on ancestral composition—can apply? Another question is, What is the practical bearing of the Mendelian method of inquiry on fixed and variable laws of inheritance? The plain man interested in scientific problems seeks an answer to these questions. To him Galtonism is the statement of a theory based on the mathematical

adjustment of a series of observations culled from innumerable sources at various times, and of deductions from the finished product—the *blend*. To him, again, Mendelism is the expression of a principle which involves no theory, in fact, which rather ignores any theory, but rather relies on actual experiment to analyze and reconstruct the constituents of the apparent blend, and to find that certain elements are missing, while others have been intercalated—in fact, that the *blend* is not a complete blend. The theories enunciated by Galton with marvellous ingenuity have been worked out mathematically by authorities like Prof. Karl Pearson, from whose labours have sprung the statistical theories of the Biometricians. The Mendelian method of inquiry recognizes that purity of type may be absolute, and that it may arise in *individuals* or any later generation bred from heterozygotes. The views based on ancestry as submitted by Galton regard purity of type as relative, and arising by the continued selection of individuals. In Galton's system no account is taken of dominance, a phenomenon which plays a conspicuous part (judging from repeated experiments undertaken with the view of impartially testing the proposition) in the practical application of a scheme of heredity. The school of experimental biology, of which Mr. Bateson is so distinguished a leader, proceed by examining the salient features of hereditary (direct) descent, and test the method by applying it in practice to the crossing and breeding of plants and of such animals as are accessible to observation and experiment. They assert (and meanwhile the scientific neutrals keep the ring) that though undoubtedly there are cases which cannot yet be subjected to Mendelian analysis or synthesis, they at the same time claim that there is no large group of facts in heredity to which the Galtonian system or any modification of it exclusively applies. The mathematical division and apportionment of characteristics may apply quite satisfactorily to characteristics which blend in the offspring. But what about those characteristics which do not blend—or even others which are intercalated? Do they emerge from some remote ancestor or collateral admixture? Under what law of inheritance do such isolated or dominant characteristics emerge? And is such a law discoverable? There are certainly some characters which do not blend. The colour of the eyes in children is an instance ready to hand. When the eye-colour of the two parents differs in tint, we never find a blended colour of the eyes in any of the offspring; the child inherits its eyes from one parent only, or from some more remote ancestor. In a curious case, in the child of a neighbour of mine, the refusal to blend is still more significant. In this child the right eye is bright blue, and the left eye is dark brown, corresponding with that of each of the parents.

Mr. Bateson implies (p. 131) that, had segregation been known to Galton, the law of ancestral heredity would not have been promulgated; and that it is obvious that so soon as that phenomenon is recognized and appreciated all question of useful or direct applicability of the law of ancestral heredity is at an

end. That method of representing the phenomena of heredity and all modifications of it are based on the assumption that any individual can transmit the characteristics of any ancestor, and especially of any recent ancestor. Statistical examination of ancestral composition may occasionally give a prediction in good correspondence with fact, but this, he again avers, is due to coincidence and not to any elements of truth in the ratiocination by which the prediction was reached.

Of the practical application of Mendelian principles much might be discussed and stated even in this early stage of the study of the new science of Eugenics. It may be anticipated that a general recognition of the chief results of Mendelian analysis (and synthesis) will bring about a profound change in man's conceptions of his own nature and in his outlook on the world. One of the author's final sentences is pregnant with far-reaching significance:—"The outcome of genetic research is to show that human society can, if it so please, control its composition more easily than was previously supposed possible." Man, the unit, the individual, can, with the aid, the co-operative participation of his fellows, work out his own redemption. It may even be possible for Man to improve his own race and breed, cultivating the desirable and eliminating the unfit.

The reign of Law is permanent, progressive, irresistible. In the course of cosmic evolution, whatever makes for the good of the species, the race, the individual, tends to become *dominant*; whatever obstructs, represses, and restricts, and is therefore harmful, tends to become *recessive*; and from an unknowable origin, Nature, by devious ways and by circuitous routes, attains her end and achieves her purpose, and the result of the combined forces of matter and function persists—the survival of the fittest.

It is a privilege to have read Mr. Bateson's work, and to have assimilated, if even inadequately and in dosimetric instalments, the exposition of the principles which he so ably advocates, illustrated with concise tables, as well as figures and coloured plates, which enhance its value as a solid contribution to English Science.

FREDERIC N. WILLIAMS.

Die Blütenpflanzen Afrikas, eine Anleitung zum bestimmen der Gattungen der Afrikanischen Siphonogamen. Von FRANZ THONNER. Berlin: Friedländer. 8vo, pp. xvi. 672. Price 10 m.

THE idea at the back of this work is a good one. The author has set himself the task of compressing into a single volume, for the use no less of travellers and colonists than of expert botanists, the salient features of every genus of African plants known at the present time. The foundation is furnished by Engler & Prantl's *Die naturlichen Pflanzenfamilien*, reinforced by the *Genera Siphonogamarum* of Dalle Torre and Harms. With these useful volumes as guides, he introduces the reader to an elaborate key

of the various orders, suborders, families, and tribes as understood by the authors above mentioned, after which come the generic characters succinctly epitomised. A hundred and fifty excellent plates and a map showing the phytogeography of Africa are appended. The volume also includes some columns of statistics relating to distribution, a glossary of terms, and a good index.

This is not the place to criticize the classification Dr. Thonner adopts. Whatever merits it may possess from the philosophical point of view, there can be no doubt that desperately hard labour awaits the traveller or colonist who attempts to master this classification. To take one instance—his morning's haul may include specimens referable to *Podostemaceæ*, *Saxifrageæ*, *Pittosporeæ*, *Hamamelidaceæ*, *Platanaceæ*, *Rosaceæ*, and *Leguminosæ*, yet he will find these all embraced in the order *Rosales*! Moreover, his bewilderment when he tries to use the key and finds *Malvaceæ*, for example, figuring in it eleven and *Sterculiaceæ* no fewer than twenty-one times will easily be understood. When, however, he has overcome these difficulties and discovered the "family" to which a plant belongs, the book will doubtless be of great service, for although the letterpress arrangement into subfamilies and tribes is faulty, inasmuch as it does not immediately arrest the eye, the salient features of the genera are set out with admirable clearness.

Coming to details one notices that *Hiernia* is transferred to the neighbourhood of *Pseudosopubia* in *Scrophulariaceæ*. Professor Engler is the authority for this; but seeing that he referred to *Scrophulariaceæ*, *Zenkerina*, an undoubted Acanthad of the tribe *Nelsonieæ*, some hesitation might have been expected before his lead in this matter was followed. *Camarotea* is retained among the *Ruellieæ*, although its true position is now known to be near *Isoglossa*. This last is made to include *Melittacanthus*, a proceeding quite uncalled for and not what one would expect to find in a compilation. The case of *Styasasia* raises an interesting point in nomenclature. Miquel created the genus *Isochoriste* for a plant of the Indian Archipelago which was alleged to differ from *Asystasia* in having a two-lipped corolla. When working at Welwitsch's *Acanthaceæ*, I was confronted with a specimen having all the characters of *Asystasia* except a small and strongly bilabiate corolla, which, trusting to Miquel's definition, I placed in *Isochoriste*. C. B. Clarke afterwards examined Miquel's type, and found it to be a well known species of *Asystasia*. Under these circumstances *Isochoriste* Miq. fell to the ground, and I redescribed Welwitsch's plant under the generic name *Styasasia*. Consequently to sink *Styasasia* in *Isochoriste* Miq., as Dr. Thonner does, is entirely without warrant. Then *Renschia* is merged in *Tinnea*; but seeing that it was accepted by Briquet in the *Pflanzenfamilien* and by Baker in the *Flora of Tropical Africa*, its retention as a distinct genus would seem advisable, at least for the present. *Pentanopsis*, too, is a good genus, and should be kept apart from *Oldenlandia*; *Forsythiopsis* is as certainly a bad one, having no characters to distinguish it from *Ruttya*.

Did space permit, one might carry these criticisms much further; but most of them would, after all, involve matters of opinion alone. We will therefore conclude by offering Dr. Thonner our due meed of praise for his compilation, not unmindful of the fact that its chief defect—over-elaboration—has its good side, as it testifies to the spirit of thoroughness brought to a laborious and exacting task. The cheapness of the book is remarkable. S. M.

The Flora of Glamorgan. Edited by A. H. Trow, D.Sc., F.L.S. Section ii. Calycifloræ [pp. 45–78] 1908. Section iii. Corolliflorae [pp. 79–132] 1909. Cardiff: Lewes.

In this Journal for 1907 (p. 414) we criticized somewhat severely the first instalment of this work, which is issued as a Supplement to the *Transactions of the Cardiff Naturalists' Society*. We are glad to note, especially in part iii., a distinct advance in many ways upon the first, notably in the inclusion of records from Mr. Riddelsdell's Flora published—although this is not mentioned, as it should have been—as a Supplement to this Journal for 1907. We are always willing to place our pages at the disposal of fellow-workers, but an acknowledgement of the help thus afforded is usually made.

Part ii. begins with a list—by no means a complete one, as our former notice showed—of "additions and corrections to Section i." The number of Welsh names and the plants to which they are applied lead us to doubt their genuineness: it seems extremely improbable that so uncommon and insignificant a plant as *Trigonella purpurascens* (which by the way is not "Fenugreek") should have obtained a popular appellation. Among the plants requiring confirmation we note *Vicia bithynica*—it may perhaps be worth while to state more definitely than has been done the locality which stands as its only authority for Glamorgan: the specimen in the National Herbarium is labelled by J. E. Bowman "Wood near the Bristol Channel between Cardiff and Penarth Head, 16 June 1837." But Dr. Trow is wrong in stating that it was "on the strength" of this specimen that the plant was "admitted to T. B. and English Botany edition iii."; Watson's authority was the note in Hooker's *British Flora*, ed. 5, i. 19—"Near Cardiff; J. E. Bowman"—and Syme doubtless followed Watson. The specimen however shows there was no mistake in determination, and this more definite statement of the locality may lead to further search.

Many of the notes show careful observation of local circumstances. Thus of *Melilotus arvensis* we read:—"Barry Island, from before 1905 onwards, on newly exposed red marl forming at first the sole vegetation, and therefore very suggestive of its probable value as green manure for such sterile soils": of *Onobrychis*—"It succeeds so well on the Triassic marls and conglomerates that it spreads and establishes itself on the railway-banks, as at Sully. It seldom succeeds on the Lias, generally

dying out in the second year, but near Rhoose railway station it flourishes even on this formation. I have seen the sainfoin on a field at Penarth on the boundary between the Rhaetic and Triassic marls completely disappear from the Rhaetic end while it continued to flourish on the Triassic portion." Critical botanists will hear without regret—unless the gentleman referred to is better known as an expert than we suppose—that "owing to the appointment of Mr. Illtyd Buller Pole-Evans to the position of plant pathologist to the Transvaal Agricultural Department, he was unable to complete his study of *Rubus* and *Rosa*"; a "fuller treatment" than that now given will appear in an Appendix. *Bupleurum tenuissimum*, which is not in Mr. Riddelsdell's Flora, is reported from two localities and entered as native; "the plants are easily overlooked, and in no way associated with ballast." The curious fondness for including plants which have no claim to appear in the list, to which we referred in our previous notice, is exemplified by the entry of *Sium latifolium*—duly furnished with a Welsh name—of which we read "Many records, all doubtless referring to luxuriant specimens of no. 690" (*S. erectum*).

In the third section a change of plan is announced: "The list of records has been considerably curtailed, by inserting them for those districts only where the species is rare or local"; this we regard as an improvement. The method followed is more critical; casuals are severely treated, even their names being sometimes suppressed! so that, although "No. 822 is not infrequent as a casual and has been reported by five correspondents," we have to consult the 9th edition of the *London Catalogue* in order to ascertain that *Chrysanthemum Parthenium* is intended. Dr. Trow's notes are a welcome feature of this third part, indicating as they do experimental undertakings which are likely to lead to interesting and even important conclusions. The most important of these—his investigations into *Senecio vulgaris*—we have reprinted on p. 304; another note of almost equal interest is that on *Carduus tuberosus* (p. 96). The treatment of the *Hieracia* is held over for the Appendix: "There can be little doubt that the segregates recognized by Linton stand the test of experimental culture. As hybrids are rare, the forms cannot very well be due to the recombination of characters in the offspring of these. I have grown two closely allied forms from seed for two generations, and, influenced by the results, suspect that most if not all of the recognized varieties are distinct and constant types."

Another note of interest, of a different character, is that on *Anaphalis margaritacea*, the status of which, as to nativity, "is not yet satisfactorily fixed, and cannot be until its history has been thoroughly re-investigated." When first recorded for Glamorganshire by Lhwyd (in R. Syn. ed. 3, 182) in 1724, it occurred "on the banks of Rymny River, for the space of at least twelve miles," and it is now "found all over Glamorgan, with the exception of the peninsula of Gower and the heavy clay land of the Vale of Glamorgan, and ascends from the lowest levels to a height of 1500 feet." The habitat, given by Babington as "moist

meadows; established by rivers, etc.," is, Dr. Trow says, "quite misunderstood. It is most at home on broken stony ground which is well drained and dry in summer; and where, owing to the comparative infertility of the soil, it runs little danger of being overgrown and smothered by taller plants. Its original habitat appears to have been the gravels left high and dry by the heavy floods of the Rhymney; for there were neither railway-embankments, coal-tips, nor large quarries in Glamorgan in 1724. At the present time, however, it is chiefly found on 'made' ground. It is quite incapable of growing in 'moist meadows' amongst grass. Once the fertility of the habitat rises to the point necessary to support a luxuriant crop of grass, the fate of the cudweeds, 'hardy perennials' though they be, is sealed. The plant is strictly adapted to the 'open formation'—hence its occurrence on sand-dunes, river gravels, railway-embankments, mountain screes, coal-tips, slag-hills, and even 'bare rock,' is readily understood."

These extracts will show that, as has been already said, the Flora contains much that is of interest, and will well repay perusal.

BOOK-NOTES, NEWS, &c.

The Liverpool Botanical Society has issued the first volume of its *Transactions* (8vo, wrapper, pp. 109, price 4*s*.) containing various papers on local and general botany. Among the former we note a list of the Hepaticæ of South Lancashire, by Messrs. J. A. Wheldon and W. G. Travis, and a paper by the latter on plant remains in peat at Aintree; Messrs. Wilson and Wheldon's description of a new lichen, *Cladonia luteoalba*, we reproduce on p. 324. Mr. A. A. Dallman (the editor of the *Transactions*), and Miss M. H. Wood print a very full and interesting "Biographical List of Lancashire Botanists," in which the *Biographical Index of British Botanists* "has been freely utilized and may be said to largely form [*sic*] the foundation of the list, which has been arranged on a very similar plan." Among general papers the most important is Mr. F. N. Williams's exhaustive study of *Honkenya peploides*, which seems somewhat out of place in a local publication. Mr. Williams distinguishes and describes three principal varieties:—α *latifolia* Fenzl, β *oblongifolia* Fenzl, and γ *apetala*, with various subvarieties; the first is the British plant.

A valuable addition to the series of "Nature Books" is that devoted to *Fossil Plants*, published by Messrs. Gowans and Gray. It consists of sixty reproduced photographs of plants from the Coal Measures, with eleven pages of explanatory text by Mr. E. A. N. Arber. With a very few exceptions the fossils have been carefully selected for illustration. They will be a great help to student collectors in determining the position of the specimens they find brought up from coal mines. Somewhat out of keeping with what we imagine is the main use of the work are the admirable reproductions of several stem-structures, which can be of

use only to advanced students; a more popular introduction rather than the descriptions of species would have been more helpful to those for whom the little work is, we suppose, intended. But we should regret to say a word to detract from the value of this remarkable little volume, which the enterprising publishers offer for sixpence.—W. C.

The new (third) edition of the first volume (*Exkursionsflora*) of the admirable *Flora der Schweiz* of Drs. Schinz and Keller (Raustein, Zürich, price 6 francs 80 centimes) is in many ways an advance on its predecessor, excellent as that was. To begin with, it is larger—not in bulk, which remains commendably convenient for the pocket, but in quantity—648 pages against 586. The arrangement strictly follows that of Engler and Prantl, which will doubtless in time be adopted for all floras, and the nomenclature conforms to the Vienna Rules as interpreted by Schinz and Thellung; various critical genera have been revised by experts. Synonyms and accepted names are brought into one series instead of being indexed separately as in the preceding edition. There is, however, still room for improvement in arrangement in this particular: the entries which run thus, "*Galeobdolon luteum* Hudson = Lamium Galeobdolon (L.) Crantz," should have the number of the page added, thus avoiding the trouble of a second reference to the index—indeed, an indication of the page only would be sufficient and would reduce the bulk of the index. It would, we think, be worth while to translate the volume into English, especially as the English edition of Gremli's useful Flora is out of print: a French translation already exists, and we commend the suggestion to the enterprising publisher. We have referred on p. 322 to a question of nomenclature connected with the work.

The Bradford Libraries Committee about three years ago acquired the scientific library of Dr. F. A. Lees, which contained a large collection of books and pamphlets bearing on geographical botany, and also his herbarium, of about 25,000 specimens, which is preserved in the Cartwright Memorial Hall. The Committee has recently issued (price 3*d*.) a classified and well-indexed Catalogue of the books and pamphlets, which should be very useful to botanists working in the library.

Dr. G. S. West has succeeded Mr. Hillhouse as Professor of Botany at University College, Birmingham. Mr. D. T. Gwynne-Vaughan has been appointed Professor of Botany at Queen's College, Belfast.

We hope to notice in our next issue the volume on *The Botany of Worcestershire* by Messrs. John Amphlett and Carleton Rea, which was announced and advertised in our issue for April; we mention it now in order to direct to it the attention of those who may be glad to use it during the present season. So far as we can judge from casual inspection, the work, which is published by Messrs. Cornish Brothers, 37 New Street, Birmingham, price 25*s*. net, is a valuable addition to our list of local floras.

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JAMES BRITTEN, K.S.G., F.L.S.

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THE NOMENCLATURE OF THE BRITISH *MELICÆ*.

THERE are two British species of *Melica*, both of which occur typically in woods. One is widely distributed throughout Britain: the other is found chiefly in the North. The common species, distinguished by its erect spikelets, has generally been named *Melica uniflora*: the northern species, distinguished by its pendulous spikelets, has generally been named *M. nutans*. These names have, however, been recently called in question. Messrs. H. and J. Groves, in their edition of Babington's *Manual* (1904), have used the name "*Melica nutans* Linn." for the common species, and for the northern species they have used the name *Melica montana*. In doing this, they have doubtless been guided by the names used by Hudson (Fl. Angl. ed. 2, p. 37, 1778); though I hope to show that *M. nutans* Linn. and *M. nutans* Huds. were not intended to designate the same species, and were not so used by systematists before Messrs. Groves. As Messrs. Groves have been followed by Dr. Rendle and Mr. Britten in their *List of British Seed-plants and Ferns* (1907), by the compilers of the *London Catalogue of British Plants* (1908), and by the authors of recent county floras, it is pertinent to enquire if this alteration of generally accepted names is justifiable.

Linnæus (Spec. Plant. p. 66, 1753) gives three species of *Melica*: (1) *M. ciliata*, (2) *M. nutans*, and (3) *M. altissima*. The first and third of these are not British plants, and hence do not concern us at present. The second, *M. nutans*, includes the two British species, as is proved by the citations from Bauhin. There are hence the following possible alternatives open to us:—(*a*) We may give the Linnean name *M. nutans* to our northern species, and the earliest available name (*M. uniflora*) to the common species. This is the plan usually adopted. (*b*) We may give the Linnean name *M. nutans* to the common species, and the first available name (*M. montana*) to the northern species. This is the plan followed by Messrs. Groves (*loc. cit.*). (*c*) We may reject the aggregate Linnean name *M. nutans*, and use the first available name for each of the segregates. These names would be *M. uniflora* for the common species and *M. montana* for the northern species: this is the plan adopted by Lamarck and De Candolle (Syn. Plant. p. 125, 1806).

The third of the above courses would appear not to be permissible by the present rules, as it can scarcely be maintained that the Linnean name *M. nutans* has become a permanent source of confusion or error; and we are really left to choose between the alternative associated with the names of Messrs. Groves and that followed by practically all other systematists.

When a taxonomic group is divided into two or more smaller groups, it would appear, from Section 6 of the Vienna Rules (see Journ. Bot. 1906), that the original name is to be retained for that segregate which is the type or the origin of the original group.

Is it possible to decide which of the two British segregates is the type of the *Melica nutans* of Linnæus? I think that it is.

Linnæus (*loc. cit.*) denotes his *Melica nutans* thus:—"Melica petalis imberbibus, panicula nutante simplici." The second phrase of this short description is, I consider, decisively in favour of the identification of the type with our northern species; and this view is apparently taken, with almost if not quite absolute unanimity, by the older systematists, including, in my opinion, even Hudson (*loc. cit.*).

A reference given by Linnæus (*loc. cit.*) to his *Flora Lapponica* provides us with a clear and unequivocal description; and, being written by Linnæus himself, it may fairly be used to assist us in determining which of the British segregates we should regard as the type of "*Melica nutans* Linn." The first line (see Fl. Lapp. p. 23, 1737) itself is decisive:—"Melica floribus sub culmo pendulis." Only our northern species has spikelets which hang down "sub culmo": the common species has erect spikelets. Further, it is scarcely possible to describe our northern species in terms more apt than the following:—"Culmus in summitate nutat, cui flores solitarie pedunculis tenuissimis adnectuntur, ita ut omnes flores sub culmo penduli sint" (Fl. Lapp.). Everyone who has seen "the real *Melica nutans*," to quote from Sir J. E. Smith (Eng. Bot. t. 1059), in our northern woods is fully alive to the grace and beauty of its pendulous florets. The character is insisted on in all the floras, including that edited by H. and J. Groves. The citation from Bauhin (in Fl. Lapp.) is further proof, if further proof be needed, that Linnæus is here describing our northern and not our common species.

In view of the usually accepted trivial name of the common species, the phrase (from Fl. Lapp.) "Cal. Gluma uniflora" may mislead the incautious. It must be noted, however, that this phrase does not refer to the species but to the genus; for Linnæus says: "Characterem hujus generis brevissimum exhibeo. Cal. Gluma uniflora. . . ." This view of the phrase is further strengthened by Linnæus's *Genera Plantarum* (ed. 1, p. 335, 1737), where the description of the genus again commences with "Calyx Gluma uniflora," and the whole generic description is simply that which follows the words "Characterem . . . generis . . . exhibeo" in the *Flora Lapponica*, with additional characters derived from other organs. The phrase is not a happy one, and Linnæus amended it later; for we find, in the fifth edition of his *Genera Plantarum* (p. 31, 1754), that "Cal. Gluma uniflora" has become "Cal. Gluma biflora." As a matter of fact, our northern species has two perfect and some imperfect flowers, and our common species one perfect and one imperfect flower. Smith (Fl. Brit. 91, 1800) modifies the expression to "Cal . . . sub-biflorous."

It is plain, therefore, if we may judge from the clear specific description given by Linnæus himself in a work which he quotes in his *Species Plantarum*, that our northern species should be regarded as the type of *Melica nutans* Linn.

The herbarium of Linnæus contains a specimen of *Melica*,

which, though unnamed, has the number "2" written (by Linnæus himself) underneath it. This specimen is the same as our northern species; and, as the *Melica nutans* of the *Species Plantarum* is also number "2," it is fair to say that our northern species is the "*Melica nutans* Linn. herb." Hence the herbarium of Linnæus confirms the view obtained from his own description that our northern species is the type of *Melica nutans* Linn., and that the northern species, therefore, and not the common one, must bear this name. I am perfectly aware that it may be argued that Linnæus may not have had this specimen before him when describing his species; but it is, nevertheless, quite legitimate to use the specimen as confirming Linnæus's description, especially when it has not been proved that Linnæus ever handled our common species at all. Moreover, *M. uniflora* is a rare plant in Scandinavia, and absent from Lapland; and it is obvious, I think, that Linnæus took the Lapland plant as his basis.

History, too, is on the same side; for a study of the remarks of the older systematists proves that several of them specially considered this matter, and decided the issue in this way. Hence description, specimen, distribution, and history are unanimous in declaring that our northern species is the type or origin of the *Melica nutans* of Linnæus.

It may be that, in using the name "*Melica nutans* Linn." for our common species, Messrs. Groves have acted under some misapprehension of Hudson's meaning. They may have regarded the names "*M. nutans* Linn." and "*M. nutans* Huds." as synonymous; but it would appear from a consideration of the citations given by Hudson (*loc. cit.*) that such was not this author's view. On the contrary, he most carefully restricted the phrases "panicula nutante simplici" (Sp. Pl.) and "Melica floribus sub culmo pendulis" (Fl. Lapp.) to the northern species (his *M. montana*); and the latter phrase cannot, by any conceivable interpretation, be taken to include, or to denote in any way whatever, our common species. The discrimination which Hudson also exercised with regard to his citation from Bauhin further supports this view. Again, the characteristic phrases from Sp. Pl. and Fl. Lapp. were not quoted by Hudson under his *M. nutans*, as they doubtless would have been had he regarded it as synonymous with "*M. nutans* Linn."; and here again Hudson's discrimination in the citation from Bauhin shows that this view is sound. Hence I maintain that Hudson himself admits (*a*) that his own *M. nutans* and the *M. nutans* of Linnæus are not synonymous; (*b*) that in giving the name *M. montana* to our northern species, he was giving a name to a species already in rightful possession of one; and (*c*) that in giving the name *M. nutans* to our common species, he was using a name which was already applied to another legitimate species. This procedure of Hudson, unfortunately, is not without precedent in the history of synonymy. The view of Hudson's names which I am here presenting is not new. It is, in fact, indicated in the writings of the older systematists, for

example, to mention only a few, Hudson, Withering, Aiton, Martyn, and Sir J. E. Smith.

Messrs. Rendle and Britten have kindly pointed out to me a reference by Linnæus (Fl. Angl. 1754) to our common melic-grass in Ray's *Synopsis*, which might be interpreted as indicating that Linnæus, in 1754, regarded our common species as the type. There are, however, two reasons for not regarding this reference as of prime importance. First, there is no reference in the *Species Plantarum*, where our botanical nomenclature begins, to the Melicas of Ray's *Synopsis*; and hence any post-1753 reference to the Melicas of the latter work, by Linnæus or any other botanist, is not, by the Rules, *ad rem*. The Rules, in this regard, may or may not be reasonable, but they are clear. Secondly, it is conceivable that Linnæus only meant that our common plant was to be included under his *M. nutans* as a variety; and this indeed would appear to be the view taken by subsequent editors of the works of Linnæus, as some of them quote the full reference to Retzius's species *M. uniflora* in this way. Schreber (Beschr. Gräs. p. 62, 1769) also separates our common plant as a variety; and Hudson, in the first edition of his *Flora Anglica* (p. 31, 1762), only has one species (*M. nutans*) and a variety. This species, judging by the citations, would appear to be our northern one; although the single citation for the variety would indicate that Hudson had not, at this date, a clear conception of the two segregates, or, at least, of their synonymy.

Messrs. Rendle and Britten (in Journ. Bot. 1907, p. 444) briefly explain their position by the remark that they follow Hudson because he was the first to distinguish the species. As a matter of fact, the two species were distinguished by pre-Linnean botanists, and Hudson was simply the first to apply the binomial system of nomenclature to them. It is possible, however, that the brevity of the statement is responsible for its apparent ambiguity. Are we to understand that Messrs. Rendle and Britten advocate a rule that, quite apart from the merits of a particular case, the first allocation of binomial names to the segregates of an aggregate group must invariably be followed? Must such names be followed in a case (which, I consider, for the reasons already given, holds with regard to our Melicas) when they can be proved, by the Rules, to be invalid? Or are we to believe that such names cannot be invalid under any circumstances? In my judgment, Hudson ought not, in this case, to be followed, as his *M. nutans* is not the type of the *M. nutans* of Linnæus.

To me, the general result is clear. The Linnean name *M. nutans* must be given to our northern species; and, as Hudson's name *M. nutans* is therefore not available for our common species, we must give it the earliest valid name. This name is *Melica uniflora* (Retzius, Obs. fasc. 1, p. 10, 1779). Retzius evidently went into the matter of the Melicas very carefully, for he tells us that he examined more than a thousand specimens, and that the two species come true from seed. If my judgement be correct, therefore, the proper allocation of names is that in Druce's

List of British Plants (1908), in the modern German floras (see Ascherson and Graebner, *Mitteleuropäischen Fl.* ii. pp. 350, 352, 1900; Reisland u. Brandt in Koch's *Syn. d. Deutschen u. Schweizer Fl.* iii. p. 2744, 1907), and in the works of the overwhelming majority of the older systematists. In matters of nomenclature, the final decision must always be determined by the balance of evidence; and, in the case of our Melicas, it would appear that the return by Messrs. Groves to Hudson's allocation of names, an allocation deliberately, consistently, and almost unanimously rejected by the older systematists and not generally accepted even now, is not based on sufficient grounds.

C. E. Moss.

Dr. Moss has kindly given us the opportunity of reading his note on the *Melica* names. Our view of the matter is briefly this:—Linnæus's name *M. nutans* must be taken to include both of our British species; Hudson was the first to separate them on the binomial system, and therefore, on the accepted principle that "the author chooses," he had the right to re-name whichever species he pleased, and although we may regret that he did not retain the name of *M. nutans* for the more northern of them, we cannot set his naming aside.

As we read the "Rules," the whole question turns on whether or not Linnæus's *M. nutans* included *M. uniflora* Retz. If the answer is in the affirmative, as we think it must be (and as Dr. Moss allows), we hold that according to the Rules Hudson's naming must stand. The description in *Species Plantarum*, which is different from that in *Flora Lapponica*, and the synonymy quoted, seem to us to point to his intention of including both the plant named *M. uniflora* Retz. and his Lapland plant, and seem to preclude the possibility of contending that Linnæus was unacquainted with the former plant, which occurs in Sweden and nearly all over Europe.

As we have pointed out in our paper on the use of Linnean specific names (Journ. Linn. Soc. xxxv. p. 371), "most of Linnæus's species are unlike those of later authors, in that they do not represent plants discovered or discriminated by Linnæus, but plants already more or less identified, which he has formulated as species under binomial names, and the specimens which happen to bear the names, often incorrectly, in his herbarium afford but little evidence of what was intended, as against that to be gathered from the synonymy quoted and from contemporary works."

Dr. Moss's attempt to set up a "type" of the species on the description given in *Flora Lapponica*, in spite of the quite altered description in *Species Plantarum* and the synonymy therein quoted, seems to us to be quite inadmissible.

H. & J. Groves.

As the Museum *List of British Seed-plants* is specially referred to by Dr. Moss, the following note by its compilers may be added.

Dr. Moss says that the reference by Linnæus in his *Flora Anglica* "might be interpreted as indicating that [he], in 1754, regarded our common species as the type." We do not see any possibility of "interpreting" it otherwise. Ray (Syn. ed. 3, 403) clearly defines the two species, which he numbers 6 and 7; Linnæus names 6 *Melica nutans*, and makes no reference to 7—evidently because in Sp. Pl. he did not separate the two species. The absence of reference in Sp. Pl. to R. Syn. can hardly affect the case, as the *Synopsis* is only occasionally quoted. We confess our inability to discover to what "Rules" Dr. Moss refers, and hence can express no opinion as to their clearness; but there is absolutely no reason for supposing that at the beginning of April 1754 (the date of the *Flora Anglica*) Linnæus had in any way modified his conception of *Melica nutans* in Sp. Pl. (1753), seeing that in Sp. Pl. ed. 2 (1767) he reprints without alteration the description and synonymy of ed. 1.

We do not think that any "ambiguity" in our remark that Hudson "was the first to distinguish" the two species would be "apparent" to the ordinary reader; it certainly could not appear ambiguous to Dr. Moss, with whom we went fully into their history. With regard to his first question, it seems to us obvious that "the first allocation of binomial names to the segregates of an aggregate group must invariably be followed"; it is equally obvious that if such names "can be *proved* to be invalid" they cannot be maintained, but in the case under consideration we do not think such proof has been adduced.

Our position is indeed well summed up by Dr. Moss in a letter to one of us, in which he says: "I fully grant (1) that, by the synonymy in Sp. Pl., Linnæus included our two British species; (2) that Hudson was the first to separate the two species after Linnæus; (3) that if the allocation of names of the first 'splitter' after Linnæus be followed, the names must be as you say."

A. B. Rendle.
James Britten.

ALABASTRA DIVERSA.—Part XVIII.

By Spencer le M. Moore, B.Sc., F.L.S.

(Concluded from p. 297.)

5. A New Hibbertia from Western Australia.

Hibbertia (§ Euhibbertia) **Sargenti**, sp. nov. Suffrutex bispithameus, caule sat valido paullo supra basin ramoso ramis erectis teretibus frequenter foliatis piloso-pubescentibus, foliis sessilibus oblongis vel anguste oblongo-lanceolatis obtusis sæpius obtusissimis margine leviter revolutis integris vel sub apice breviter paucidentatis coriaceis utrinsecus piloso-pubescentibus novellis albo-villosis, floribus pedunculis brevibus villosis insidentibus bracteis paucis suborbicularibus scariosis conspicuis stipatis,

sepalis oblongo-lanceolatis acuminatis dense villosis, petalis sepala excedentibus late obovatis emarginatis, staminibus circa 65 additis staminodiis exterioribus paucis parvis subulatis filamentis inter sese fere liberis, carpellis 5 villosis, ovulis pro carpello 2.

Hab. Foot of Mount Bakewell, in black humus with granite and quartz subsoil; *O. H. Sargent*, 517, in Herb. Mus. Brit.

Folia vulgo 2–3 cm. long., 8–10 mm. lat., in sicco griseo-olivacea; costa media tenuis solum aspectabilis. Bracteæ circa 5 × 4·5 mm., castaneæ. Pedunculi summum 5 mm. long. Flores lutei. Sepala 8 mm. long. Petala 12 mm. long., juxta basin 3·5 mm. sursum 7·5 mm. lat. Filamenta tenera, circa 2 mm. long.; antheræ oblongæ, 1·25 mm. long. Staminodia circa 1 mm. long. Carpella ægre 2 mm. long.; stylus subterminalis, filiformis, 3·5 mm. long.

To be inserted between *H. lasiopus* Benth. and *H. potentillæflora* F. Muell., differing from both in its shortly pedunculate flowers, from *H. potentillæflora* in its villous carpels, and from *H. lasiopus* in its oblong leaves. On a first view it might be mistaken for *H. montana*, to which, Mr. Sargent tells me, some authorities whom he has consulted would refer it; but I cannot accept this opinion, for *H. montana*, besides having glabrous carpels, a matter of some systematic importance in this genus, belongs to another subsection of § *Euhibbertia*, of which one of the features is the absence of staminodes.

6. Note on Achatocarpus Triana.

Triana proposed this genus in 1858 (Ann. Sc. Nat. Sér. iv. ix. p. 45) after careful examination, referring it to *Phytolaccaceæ*. In 1880, Bentham & Hooker (Gen. Pl. ii. 26) transferred it to *Amarantaceæ*, and still another change—to *Chenopodiaceæ*—was proposed by Baillon (Hist. des Plantes, ix. p. 171) in 1886. Seven years after, the genus came again under review, when Schinz & Autran (Bull. Herb. Boiss. 1893, pp. 1 *sqq.*) adopted Triana's original view on microscopic as well as morphological grounds, which view was further supported by Engler (Pflanzenfam. Nachtr. iii. 1 B, p. 154). As, moreover, we find *Achatocarpus* included in Hans Walter's recent monograph of *Phytolaccaceæ* in *Das Pflanzenreich*, its systematic position seems finally assured.

Of the twelve species enumerated in Walter's monograph Mexico claims two, the Andine region three, and Argentina, exclusive of its Andine portion, one; while Paraguay has five and Brazil one species.

The object of this short note is to point out that at least one more species is native to Brazil, there being in the British Museum specimens from Corumbá collected by Robert in 1902. These are certainly distinct from the species Walter describes founded on a plant of Sellow's gathering; and though they are in fruit and bear no indication of flowers, they are most probably conspecific with *A. obovatus* Schinz & Autran, a native of Paraguay, not far from the northern boundary of which country Corumbá is situated.

SUPPLEMENTARY RECORDS OF BRITISH RUBI.

(April, 1900–December, 1908.)

By Rev. W. Moyle Rogers, F.L.S.

(Concluded from p. 318.)

R. anglosaxonicus Gelert.

12. Hants N. Eyre! forma.
55. Leicester! Linton! forma.

Var. curvidens Ley.

[1. Cornw. W. F. A. Rogers!]
2. Cornw. E. Vigurs!
4. Devon N.!
35. Monmouth. Druce!
41. Glamorgan. Riddelsdell!
42. Brecon. Ley!

Var. vestitiformis Rogers.

16. Kent W.! Forma.
35. Monmouth. Ley!
41. Glamorgan! Riddelsdell!
42. Brecon. Ley!
45. Pembroke. Bickham!

Var. raduloides Rogers.

[13. Sussex W. Hilton!]
22. Berks. Druce!
27. Norfolk E. Linton!
41. Glamorgan. Trow!
74. Wigton. F. A. Rogers!

Var. setulosus Rogers.

14. Sussex E. Hilton!
[17. Surrey. L. Cumming!]
40. Salop. Ley!
41. Glamorgan! Riddelsdell!
57. Derby. T. E. Routh!
58. Chester. Wolley-Dod!
64. York M.W. A. E. Bradley!

R. melanoxylon Muell. & Wirtg.

16. Kent W. Wolley-Dod!
39. Staffs. Bagnall!
41. Glamorgan. Riddelsdell!
42. Brecon. Ley!
75. Ayr!
76. Renfrew!
83. Edinburgh!
93. Aberdeen N. Trail!
94. Banff. Trail! W. G. Craib!
96. Easterness. Marshall!
107. Sutherland E. Druce!

R. infestus Weihe.

1. Cornw. W.!
14. Sussex E.! Waddell!
16. Kent W.!
34. Gloster W. Marshall!
41. Glamorgan. Ley!
58. Chester. Wolley-Dod! (conf.)
63. York S.W. T. W. Woodhead!
64. York M.W. Savery! Bradley!
75. Ayr!
76. Renfrew!
94. Banff. Trail!
98. Argyle! F. A. Rogers!
100. Clyde I.! (Bute).

Var. virgultorum Ley.

42. Brecon. Ley!
58. Chester. Wolley-Dod!

R. uncinatus P. J. Muell.

4. Devon N.!
12. Hants N. Eyre!
17. Surrey. Marshall!
38. Warwick. L. Cumming!

R. Borreri Bell-Salt.

1. Cornw. W.! F. A. Rogers!
12. Hants N. Eyre! f. umbr.
13. Sussex W.!
41. Glamorgan! Riddelsdell!
45. Pembroke. W. R. Linton!
58. Chester. Wolley-Dod! forma.
[74. Wigton. Druce!]

Var. DENTATIFOLIUS Briggs.

1. Cornw. W.!
6. Som. N. Fry and White!
[22. Berks. Druce!]
35. Monmouth. Ley!
41. Glamorgan!
44. Carmarthen. Ley!

R. DREJERI G. Jensen.

3. Devon S. G. B. Savery!
6. Som. N. H. S. Thompson!
41. Glamorgan! Ley and Riddelsdell!
49. Carnarvon. Wolley-Dod!
53. Linc. S. H. Fisher!
58. Chester. Wolley-Dod!
60. Lanc. W. Wheldon!
64. York M.W.! Bickham!
65. York N.W.! Newbould!
69. Westmoreland! Ley.
104. Ebudes N. Druce!

Var. LEYANUS Rogers.

6. Som. N. Murray. Ley!
[12. Hants N. Eyre!]
17. Surrey!
40. Salop. Ley!
45. Pembroke. Ley!
61. York S.E. H. Fisher!

Var. DUNENSIS Rogers.

48. Merioneth. Ley!

R. RADULA Weihe.

1. Cornw. W.! Davey!
9. Dorset. Linton! (conf.)
13. Sussex W. J. W. White! (conf.)
16. Kent W.!
53. Linc. S. Ley!
54. Linc. N. Ley!
58. Chester. Wolley-Dod!
60. Lanc. W. Wheldon and Wilson!
64. York M.W. (conf. wanting)
75. Ayr!
79. Selkirk. Marshall.
80. Roxburgh. Bailey!
81. Berwick. Bailey!
91. Kincardine. Trail! (conf.)
92. Aberdeen S. Trail!
93. Aberdeen N. Trail!
94. Banff. Trail!

Var. ANGLICANUS Rogers.

1. Cornw. W.!
10. Wight!
13. Sussex W. Marshall!
21. Middlesex!
23. Oxford. Druce!
[42. Brecon. Riddelsdell!]
58. Chester. Wolley-Dod!

Var. ECHINATOIDES Rogers.

9. Dorset. Murray!
13. Sussex W.!
19. Essex N. Druce!
22. Berks. Ley!
31. Hunts. Ley!
32. Northants. Druce!
[39. Staffs. Painter!]
53. Linc. S. Ley!
54. Linc. N. Ley!
55. Leicester!
58. Chester. Wolley-Dod!
60. Lanc. W. Wilson! forma.
69. Westmoreland! Forma.
91. Kincardine. Trail!
92. Aberdeen S. Trail!
96. Easterness. Townsend!

R. ECHINATUS Lindl.

13. Sussex W.! J. W. White! C. E. Salmon!
26. Suffolk W. Linton!
30. Beds!
53. Linc. S. Ley!

R. RUDIS Wh. & N.

1. Cornw. W. Davey!
32. Northants. Jackson!
35. Monmouth. Ley!
40. Salop. Painter!

R. OIGOCLADUS Muell. & Lefv.

1. Corw. W.! Davey!
[2. Cornw. E. Druce!]
16. Kent W. Gilbert!
21. Middlesex. Jackson!
40. Salop. Linton! (conf.)

41. Glamorgan. Riddelsdell!
43. Radnor!

Var. NEWBOULDII Rogers.

14. Sussex E.!
16. Kent W.! (conf.)
17. Surrey. C. E. Britton!
41. Glamorgan!
42. Brecon. Ley!

Var. BLOXAMIANUS Colem.

[6. Som. N. J. W. White!]
12. Hants N. Eyre!
[36. Hereford. Ley!]
41. Glamorgan. Riddelsdell!

R. REGILLUS Ley.

58. Chester. Bailey!

R. PODOPHYLLUS P. J. Muell.

1. Cornw. W. Davey! Tresidder!
17. Surrey. B. F. J. Cooper!
41. Glamorgan. Riddelsdell!
49. Carnarvon. Wolley-Dod! (conf.)
53. Linc. S. Ley!
54. Linc. N. Ley!
64. York M.W. G. B. Savery! G. Webster!

R. GRIFFITHIANUS Rogers.

1. Cornw. W. Davey!
3. Devon S. G. B. Savery! (conf.)
8. Wilts S. Marshall!
12. Hants N. Townsend!
17. Surrey. Marshall!
36. Hereford. Ley! (conf.)
37. Worcester. Ley! (conf.)
44. Carmarthen. Ley!
51. Flint. Wolley-Dod!
55. Leicester!
57. Derby. Routh! Jackson!

R. PRÆRUPTORUM Boul.?

27. Norfolk E. Linton! forma.
36. Hereford. Ley!
57. Derby. Linton!

R. MELANODERMIS Focke.

41. Glamorgan. Ley and Riddelsdell!

R. BABINGTONII Bell-Salt.

10. Wight!

Var. PHYLLOTHYRSUS (Frider).

14. Suss. E. Gilbert! f. aprica.
16. Kent W.! f. aprica.
17. Surrey! f. aprica. Wolley-Dod!
21. Middlesex. Jackson!
24. Bucks. C. E. Britton!

R. LEJEUNEI Wh. & N.

24. Bucks!
30. Beds!
41. Glamorgan. Ley!

R. ERICETORUM Lefv.

1. Cornw. W. Davey!
6. Som. N. Ley!
23. Oxford. Druce!
42. Brecon. Ley!
58. Chester. Wolley-Dod!

Var. CUNEATUS Rogers & Ley.

[6. Som. N. Ley!]
41. Glamorgan! Ley and Riddelsdell!
42. Brecon. Ley!

Var. SERTIFLORUS (P. J. Muell.).

3. Devon S. F. Savery!
[9. Dorset. Murray!]
[46. Cardigan. Ley!]

Var. SCOTICUS Rogers & Ley.

76. Renfrew!
87. Perth W. F. A. Rogers!
98. Argyle. Marshall!
99. Dumbarton! Marshall!
[101. Cantire. C. E. Salmon!]

R. MUTABILIS Genev.

[14. Sussex E. Hilton!]
24. Bucks. C. E. Britton!

Var. NALDRETTI J. W. White.

13. Sussex W. White! Hilton!

R. BLOXAMII Lees.

5. Som. S. Murray!
[21. Middlesex. Riddelsdell!]
Confirmation is wanted for v.-c. 63, 64, and 66.

R. FUSCUS Wh. & N.

11. Hants S. Linton.
12. Hants N. Eyre!
13. Sussex W.! Marshall.
24. Bucks. C. E. Britton!
41. Glamorgan! Riddelsdell!
50. Denbigh. Ley!
69. Westmoreland!

Var. NUTANS Rogers.

3. Devon S. Briggs! (conf.)
9. Dorset. Linton!
10. Wight!
13. Sussex W.! Marshall!
14. Sussex E. Hilton!
18. Essex S. C. E. Britton!
24. Bucks. Benbow!
36. Hereford. Ley!
[41. Glamorgan. Riddelsdell!]

Var. MACROSTACHYS P. J. Muell.

24. Bucks. C. E. Britton!
[59. Lanc. S. Wheldon!]

Var. OBSCURUS Kalt.

13. Sussex W. Linton and Marshall!
37. Worcester. Bloxam! Ley!

R. PALLIDUS Wh. & N.

1. Cornw. W. Davey!
13. Sussex W. Marshall.
23. Oxford! (conf.) Druce.
30. Beds! (conf.) Saunders.
34. Gloster W. Ley!
71. Man. Waddell!

Var. LEPTOPETALUS Rogers.

12. Hants N.
23. Oxford. Druce!
39. Staffs. Bagnall!

R. SCABER Wh. & N.

1. Cornw. W.! f. angustifolia.
2. Cornw. E. Druce!
11. Hants S. Townsend! (conf.)
14. Sussex E. Waddell! forma.
33. Gloster E.! (conf.)
41. Glamorgan! Riddelsdell! Trow!
45. Pembroke. Linton!
[58. Chester. Wolley-Dod!]

R. THYRSIGER Bab.

1. Cornw. W. Davey!
[16. Kent W. Gilbert!]
[21. Middlesex. Benbow!]
[24. Bucks. C. E. Britton!]
36. Hereford. Ley!
41. Glamorgan! Riddelsdell!
42. Brecon. Ley!
48. Merioneth. Ley!
96. Easterness. Townsend! forma.

R. BOTRYEROS Focke.

1. Cornw. W. Davey. Tresidder!
42. Brecon. Ley!
50. Denbigh. Ley!

R. FOLIOSUS Wh. & N.

10. Wight!
33. Gloster E. St. Brody!
41. Glamorgan. Riddelsdell!
93. Aberdeen N. Trail!
94. Banff. Trail!

R. ROSACEUS Wh. & N.

1. Cornw. W. Tresidder!
2. Cornw. E. Briggs.
6. Som. N. Marshall!
12. Hants N. Townsend! (conf.)
13. Sussex W. White! (conf.)
27. Norfolk E. Linton.
41. Glamorgan. Riddelsdell!
58. Chester. Wolley-Dod!
65. York N.E.!

Var. HYSTRIX (Wh. & N.).

14. Sussex E. Roper.
16. Kent W.! (conf.)

30. Beds. Druce!
32. Northants. Druce!
41. Glamorgan! Riddelsdell!
53. Linc. S. Ley!
54. Linc. N. Ley!
60. Lanc. W. Wheldon and Wilson!
63. York S.W. H. H. Corbett!
69. Westmoreland! Ley!
70. Cumberland. R. S. Standen!
74. Wigton. F. A. Rogers!

Var. INFECUNDUS Rogers.

1. Cornw. W.! Davey!
10. Wight!
13. Sussex W.!
31. Hunts. Ley!
53. Linc. S. Ley!
54. Linc. N. Ley!

Var. ADORNATUS (P. J. Muell.).

1. Cornw. W. Ralfs!
14. Sussex E. Hilton!
40. Salop. Ley!

R. HORRIDICAULIS P. J. Muell.

13. Sussex W. J. W. White! Hilton!
55. Leicester!

R. HOSTILIS Muell. & Wirtg.

12. Hants N. Eyre!
24. Bucks. C. E. Britton!
36. Hereford. Ley!
[37. Worcest. H. S. Thompson!]

R. FUSCO-ATER Weihe.

[12. Hants N. Eyre!]
[14. Sussex E.!]
36. Hereford. Ley! (conf.)
40. Salop. Ley! forma.
50. Denbigh. Wolley-Dod!
51. Flint. Wolley-Dod!

R. KOEHLERI Wh. & N.

6. Som. N. J. W. White.
13. Sussex W. J. W. White! (conf.)
14. Sussex E. Hilton! forma.
15. Kent E. Marshall!
21. Middlesex. Benbow!
49. Carnarvon. Burkill and Willis!
62. York N.E. Bailey!
[98. Argyle. Miss M. Kennedy!]

Var. COGNATUS (N. E. Brown).

16. Kent W. Gilbert!
41. Glamorgan. Riddelsdell!
46. Cardigan. Painter!

R. DASYPHYLLUS Rogers.

1. Cornw. W. F. A. Rogers! (conf.)
53. Linc. S. Ley!
54. Linc. N. Ley!
59. Lanc. S. Moss!
73. Kirkcudbright. Bailey!
75. Ayr!
76. Renfrew!

R. PLINTHOSTYLUS Genev.

1. Corn. W.! Davey! Vigurs! Tresidder!
34. Glos. W. Ley! Shoolbred!

R. MARSHALLI Focke & Rogers.

41. Glamorgan. Riddelsdell!

J. Bot. 1906, 97.

[57. Derby. W. R. Linton.]

Var. SEMIGLABER Rogers.

1. Cornw. W. Davey! Tresidder!
22. Berks. Jackson!
41. Glamorgan! Riddelsdell!

R. VIRIDIS Kalt.

12. Hants N. Townsend!

R. BELLARDII Wh. & N.

[3. Devon S. Vigurs!]
13. Sussex W.! J. W. White.
42. Brecon. Ley!
44. Carmarthen. H. H. Knight!
48. Merioneth. Ley!

R. SERPENS Weihe.

12. Hants N.!
13. Sussex W. C. E. Salmon!

[17. Surrey. C. E. Britton !]
39. Staffs. Bagnall !
40. Salop. Ley !
41. Glamorgan ! Ley !

R. HIRTUS Waldst. & Kit.

[24. Bucks. Benbow !]
[41. Glamorgan. Riddelsdell !]

Var. ROTUNDIFOLIUS Bab.

41. Glamorgan !
42. Brecon. Ley !

Var. KALTENBACHII (Metsch.).

41. Glamorgan. Linton !

Var. FLACCIDIFOLIUS (P. J. Muell.).

36. Hereford. Ley !

Var. MINUTIFLORUS (P. J. Muell.).

13. Sussex W. Hilton !
37. Worcester. Ley !

R. ACUTIFRONS Ley.

[5. Som. S. Murray !]
12. Hants N. Eyre !
35. Monmouth. Ley !
41. Glamorgan. Ley !

Var. AMPLIFRONS Ley.

6. Som. N. Murray ! forma.
36. Hereford. Ley !

R. TERETICAULIS (P. J. Muell.).

14. Sussex E. Hilton !
36. Hereford. Ley !
41. Glamorgan. Riddelsdell !
f. umbr.

R. OCHRODERMIS Ley.

3. Devon S. G. B. Savery !
55. Leicester !
80. Roxburgh. Bailey !

R. VELATUS Lefv.

[14. Sussex E. Gilbert !]
37. Worcester. Ley !
38. Warwick. Waddell !

[41. Glamorgan !]
44. Carmarthen. Ley !

R. DUMETORUM Wh. & N.

a. FEROX Weihe.

1. Cornw. W. Davey !
2. Cornw. E. Druce !
13. Sussex W. ! Hilton !
24. Bucks !
29. Cambridge. H. H. Slater !
30. Beds !
32. Northants. Jackson !
33. Gloster E. Riddelsdell !
45. Pembroke. W. R. Linton !

b. BRITANNICUS (Rogers).

18. Essex S. C. E. Britton !
34. Gloster W. !
41. Glam. Ley ! Riddelsdell !

c. DIVERSIFOLIUS (Lindl.).

31. Hunts. Ley !
41. Glamorgan. Riddelsdell !
42. Brecon !
54. Linc. N. Ley !

d. PILOSUS Wh. & N.

31. Hunts. Ley !
58. Chester. Flora, p. 113.

e. RUBRIFLORUS Purchas.

55. Leicester. Fisher !
56. Notts. W. R. Linton & Carr.

f. TUBERCULATUS (Bab.).

31. Hunts. Ley !
58. Chester. Wolley-Dod !

g. TRIANGULARIS Ley.

36. Hereford. Ley !
37. Worcester. Ley !

h. RADULIFORMIS Ley.

6. Som. N. Ley !
16. Kent W. !
31. Hunts. Ley !
35. Monmouth. Ley !
36. Hereford. Ley !
37. Worcester. Ley !

which Dr. Domin reduces to a variety of *T. præcox*, is as follows :—

"T. SPATHULATUS Opiz [Natural. lx. 105]. Caule repente; ramis abbreviatis, adscendentibus, pilis brevibus, patentibus; foliis spathulatis, utrinque pilis longis obtectis, et ciliatis; floralibus oblongis, ramorum steriliorum ovato-oblongis; floribus capitato-spicatis; pedunculis pilis brevissimis, deflexis, obsitis; calycibus pilosis, dentibus calicinis longe ciliatis; corollis tubo calicino duplo longioribus; staminibus exsertis.

"Pragæ in monte Petrin. Opiz.

"Differt a *T. piloso* Opiz: toto habitu, ramis abbreviatis, corollis majoribus, foliis spathulatis, ramorum steriliorum ovato-oblongis."

T. glaber Mill. (*T. Chamædrys* Fr., auct. pro parte, non auct. Brit.). 27. Norfolk East; sandy grass-land in the parish of Thorpe by Norwich, towards Rackheath Park. 57. Derby; near Bolsover in District P. (Permian formation), W. R. Linton, as *T. Serpyllum*. The locality is given under the latter species in the *Flora of Derbyshire*.

SOME HIGHLAND FUNGI.

By HAROLD J. WHELDON.

WHILST botanizing in the Cairngorm Mountains in July this year, Messrs. Albert Wilson and J. A. Wheldon (my father) collected and forwarded to me a number of fungi for determination. It is hoped that a list of these will prove of interest to mycologists, especially as the altitudes of many of the localities were noted as shown.

The list comprises all the species that were noticed, but as no special search was made for fungi, it is no doubt far from being representative of all the species occurring at this season. Most of the collectors' time was devoted to botanizing on the higher parts of the mountains, where fungi are presumably relatively scarce.

I should like to express my indebtedness to Messrs. C. Crossland, of Halifax, and Thomas Gibbs, of Derby, for valuable assistance.

Cantharellus cibarius Fr. Rothiemurchus Forest, up to 800 ft. Frequent.

Hygrophorus miniatus Fr. Rothiemurchus Forest, near the entrance to Glen Eunach at 1000 ft.

Omphalia sphagnicola Berk. Head of Glen Eunach, 3000 ft., and in Coire na t'Sneachda, at 2200 ft.

Lactarius rufus Scop. Rothiemurchus Forest.

Russula emetica Fr. Wood on Craig Ellachie, at 700 ft.—*R. vesca* Fr. Rothiemurchus Forest.—*R. heterophylla* Fr. Wood on Craig Ellachie, at 700 ft.

Marasmius oreades Fr. Frequent about Aviemore, seen at 1800 ft. on Sgoran Dubh Mor.—*M. peronatus* Fr. Aviemore.

Tubaria embolus Fr. Glen Eunach, at 1000 ft.

Stropharia stercoraria Fr. Pastures by River Spey at Aviemore, 500 ft.—*S. semiglobata* Batsch. Pastures by River Spey at Aviemore, 500 ft. — *S. merdaria* Fr. On deers' dung at 3800 ft. on Ben Macdhui. The solitary example found was somewhat advanced, but Mr. Crossland thought it was most probably referable to this species.

Stereum hirsutum Fr. Craig Ellachie, at 700 ft.

Poria vaporaria Fr. Craig Ellachie, at 800 ft.

Polyporus Schweinitzii Fr. Frequent in the forest, especially about the Inverdovie Sawmills, 600 ft., and on the road to Glen Eunach, at 900 ft. Young examples and older ones grew intermixed, some of the latter apparently many months old.

Boletus elegans Schum. Glen Feshie, at 900 ft.—*B. bovinus* L. Rothiemurchus Forest.

Uromyces alchemillæ Pers. Frequent near Aviemore, especially on *Alchemilla vulgaris* var. *alpestris*.

Puccinia poarum Niels. Æcidiospores on *Tussilago Farfara* on the banks of the River Spey, near Aviemore. — *P. suaveolens* Pers. With the preceding on *Carduus arvensis*.

Æcidium pedicularis Libosch. On *Pedicularis palustris* in Rothiemurchus Forest, at 700 ft.

Phyllachora pteridis Rob. On *Pteris* near Loch Morlich, at 1100 ft.

Valsa suffusa Fr. On alders near Aviemore.

Phacidium Vaccinii Fr. On *Vaccinium Vitis-Idæa* on Craig na Leacainn, at about 3000 ft., and in Coire na t'Sneachda, at 2200 ft.

Ovularia destructiva Mass. (*Ramularia destructiva* Phill. & Plowr.). On leaves of *Myrica Gale* at about 950 ft. on Creag Ellachie.

Sepedonium chrysenteron Fr. On a decaying *Boletus* in Rothiemurchus Forest at the foot of Creag a Chalamain at 900 ft.

Reticularia Lycoperdon Bull. Occurring in large black patches on heaps of sawdust near Coylam Bridge.

QUERCUS NIGRA.

By James Britten, F.L.S.

The recent American floras have corrected the misapplication of the name of this species which received the sanction of Alphonse De Candolle and has until lately been accepted by American and other botanists. But as we have in the National Herbarium the material on which was based the original description of the species and of that which has until recently borne its name, it may be

worth while to place on record the evidence which it supplies in support of the recent change.

The two plants to which the name has been applied stand thus in Linn. Sp. Pl. 995–6 (1753) :—

"*nigra*. QUERCUS foliis cuneiformibus obsolete trilobis. *Gron. virg.* 117.
Quercus folio non serrato in summitate quasi triangulo. Catesb. car. i. p. 20, t. 20.
β Quercus marilandica folio trifido ad Sassafras accedendente (*sic*). Raj. Catesb. car. 19, t. 19."

A reference to the appended synonymy will show that the transference of name occurred at a very early date. Walter (Fl. Carol. 1788) applies the name *nigra* to the var. β of Sp. Pl. and gives a new name—*aquatica*—to the Linnean species: he does not indeed in either cases cite Linnæus, but his description makes it clear that this was the case. Walter's herbarium contains a leaf of each, but unfortunately neither is labelled by him.

Had Linnæus made his *Q. nigra* consist of varieties lettered respectively α and β, as A. De Candolle, following Solander (Aiton) supposes him to have done, it might have been assumed that Walter (1788) exercised his right of choice as to which of two forms should retain the original name. This, however, was not the case, as the citation from Sp. Pl. shows—Linnæus has *nigra* as the species, with a variety β; and even had it been so, Du Roi (1772)—following Muenchhausen (1770) whose description I have not seen—makes the matter perfectly clear, as he places under *nigra* the Linnean diagnosis, adding a citation from Miller and a reference to Catesby's t. 20, while under *marylandica* he quotes Catesby's t. 19 and diagnosis.

It may however be pointed out that the species were first distinguished by Gronovius in 1762, and had he added trivial names to his descriptions, the matter would have been clear. In the first edition (p. 117) of Fl. Virg. (1743)—that cited by Linnæus—the description, which includes both plants, runs :—

"QUERCUS *foliis cuneiformibus obsolete trilobis.*
Quercus folio non serrato, in summitate quasi triangulo. Water Oak. Catesb. Hist. Carol. Vol. i. T. 20.
Quercus nigra folio trifido. Clayt.
Quercus aquatica folio non sinuato ad finem triangulo. Clayt. (quæ Quercus forte Marilandica folio trifido ad Sassafras accedente Raj. & Catesb. Hist. Carol. Vol. i. T. 19). Hujus est varietas."

In the second edition (p. 149) the two are separated; the descriptions are :—

"QUERCUS *foliis cuneiformibus obsolete trilobis, intermedio æquali.* Fl. virg. 117. Linn. spec. 995.
Quercus forte marilandica folio trifido ad Sassafras accedente. Black-Oak. *Raj. & Catesb. car.* i. *t.* 19.
Quercus nigra folio trilobato. *Clayt. n.* 789."

"QUERCUS *foliis cuneiformibus obsolete trilobis, intermedio productiore.*
Quercus aquatica folio non sinuato ad finem triangulato. *Clayt. n.* 782."

It will be seen from the above that the original diagnosis in Fl. Virg. has been extended by two words, to differentiate the two species: Linnæus quoted the original, which is applicable to both; the reference to Catesby t. 19, which he cites under his var. *β* and the two distinguishing words added by Gronovius make his description in Sp. Pl. apply to the plant now known as *Q. marylandica* (*nigra* auct.).

The trees are sufficiently characterized in Catesby's plates—it is not quite easy to see why A. De Candolle called one "mala" and the other "pessima"—and indeed are usually readily separable; but we have excellent specimens from Catesby which set at rest any possible doubt which might be raised. The "Quercus (forte) Marilandica," &c. (t. 19)—*Q. marylandica* Muench—is in Catesby's collection in Herb. Sloane 232, f. 93; the "Quercus folio non serrato," &c. (t. 20)—*Q. nigra* L.—on f. 96 of the same volume. We have also, from Gronovius's Herbarium, the Clayton numbers 782 and 789, which represent the plants of which the diagnoses have been cited.

The synonymy is as follows:—

QUERCUS NIGRA L. Sp. Pl. 995 (1753); Mill. Dict. ed. 8, n. 10 (1768); Du Roi, Harbk. Baumz. ii. 272 (1772); Britton & Br. Ill. Fl. i. 519 (1896); Britton, Man. Fl. N. U. S. 335 (1901); Gray's New Man. 343 (1908).
Q. nigra aquatica Lam. Encycl. i. 721 (1785).
Q. aquatica Walt. Fl. Carol. 234 (1788); [Solander in] Ait. Hort. Kew. iii. 357 (1789), MSS., et in Herb. Banks!; Michaux, Chênes Amer. tt. 19–21 (1801); Willd. Sp. Pl. iv. 441 (1805); A. DC. Prodr. xvi. 2, 67 (1864); Gray, Man. Bot. N.U.S. eds. 4–6; List of Pteridophyta N. Amer. 132 (1893–4); Index Kewensis ii. 672 (1895), et auct. perplur.
Q. aquatica "Catesb." Chapman Fl. S. U. S. eds. 1–3.

QUERCUS MARYLANDICA Muenchhausen, Hausvater, v. 253 (1770), ex Du Roi, Harbk. Baumz. ii. 272 (1772); Britton & Br. Ill. Fl. i. 518 (1896); Britton, Man. Fl. N. U. S. 334 (1901); Gray's New Man. 344 (1908).
Q. nigra β L. Sp. Pl. 996 (1753)
Q. nigra latifolia Lam. Encycl. i. 721 (1785).
Q. nigra Walt. Fl. Carol. 234 (1788); [Solander in] Ait. Hort. Kew. iii. 357 (1789), MSS.! et in Herb. Banks.! Michaux, Chênes Amer. tt. 22, 23 (1801); Willd. Sp. Pl. iv. 442 (1805); A. DC. Prodr. xvi. 2, 63 (1864); Gray, Man. Bot. N. U. S. eds. 1–6; Chapman, Fl. S. U. S., eds. 1–3; List of Pteridophyta N. Amer. 133 (1893-4); Index Kewensis ii. 675 (1895); et auct. perplur.

BIBLIOGRAPHICAL NOTES.

XLVII.—Smith's 'English Flora.'

The Department of Botany has recently acquired a copy of the first edition of Smith's *English Flora* (1824–28); a comparison of this with the second edition has suggested the present note. It has generally been supposed that the two editions differed only in the dates on their title-pages, but Major Wolley-Dod, when consulting this work at the Linnean Society in connection with his investigations on the genus *Rosa*, observed material differences which suggested this comparison.

The generally accepted though erroneous impression that the second edition was merely a reprint doubtless accounts for the lack of any reference to it by such accurate bibliographers as Pritzel and Jackson. In the *Thesaurus* (ed. 2, n. 8748) a detailed list is given of the four volumes which comprised the first edition, and to these is added the fifth volume, published from 1833–36. Dr. Jackson, in his *Guide* (p. 234), gives similar information, but in a note appended to his entry says, "Vols. i–iv . . . were issued very shortly before [Smith's] death"; this statement, however, is apt to mislead, as may be seen by reference to the dates of their publication. The first and second volumes were published simultaneously, early in 1824—that is to say, before March 19th, on which date their receipt is acknowledged in a letter to the author by Sir Thomas Gery Cullum, to whom the work is dedicated (*Sm. Corr.* i. 512); the third in 1825, and the fourth in March, 1828. These four volumes contain the flowering plants and ferns. Smith had himself contemplated bringing his work to a conclusion with a volume on the cellular cryptogams, but Hooker, in the preface to vol. v., remarks: "He was arrested by the hand of death . . . on the very day [17 March, 1828] he received from his printer the last sheet of the ivth. volume." At the end of vol. iv. (p. 346) is the following note:—"The numerous and very curious additions, received by the author during its progress, and announced at the end of the 23rd Class [pp. 262–74] encourage him to think the subject is far from exhausted, and to look for still more discoveries to enrich his future volumes whenever they may appear." This note also appears in the second edition (iv. p. 334), regardless of the fact that these additions and corrections are therein embodied in the text, and constitute the most important differences from the previous edition.

The publication of a second edition was begun the same year, volumes i. and ii. being issued; the third appeared in 1829, the fourth in 1830. The text of these volumes is almost identical with that of the first edition, but the intercalation of the "Corrections and Additions" somewhat alters the pagination; "a few habitats which have been added to this edition are inclosed in brackets" (iii. p. viii; note signed "R. T.," doubtless Richard Taylor, the printer). In compliance with the wish of the publishers the completion of the work was undertaken by W. J. Hooker, and

vol. v. was issued in two parts—one in 1833, comprising the Mosses, Characeæ, Hepaticæ, and Lichens by Hooker, and the Algæ by Greville and Harvey; the other in 1836, on the Fungi, by Berkeley. The volume also formed vol. ii. of the third edition of Hooker's *British Flora*, but did not accompany any future edition of that work.

The following are the more important differences between the two editions: exhaustive examination might yield others. It is probably due to ignorance of the second edition that the name of *Rosa Sherardi* has been allowed to lapse both by British and Continental authors until it was revived by the Rev. A. Ley in this Journal in 1907 (p. 207). Smith described this species in the first edition as *R. subglobosa* (ii. p. 384), but in the errata of the same volume (p. 470) he suppressed this name, restoring the older one given it by Davies in 1813; his note, which seems to have been entirely overlooked, is as follows:—"The reader is requested to expunge the name of *Rosa subglobosa* wherever it occurs, substituting in its stead *R. Sherardi*; especially at p. 384, n. 10, where the following reference should be added after the specific character: *R. Sherardi*, Davies *Welsh Botanol.* 49." The first publication of *Salix Hoffmanniana* Smith is in *Engl. Fl.* iv. p. 168 (March, 1828), and not, as quoted by the *Index Kewensis*, in *Engl. Bot.* t. 2620 (1st Jan. 1830). In vol. ii. the contents of the pages in the two editions are identical up to p. 360; the insertion on this in ed. 2 of *Mespilus Cotoneaster* throws forward the contents of the remainder of the volume, although the number of pages remains the same. For purposes of citation the second and more generally known edition is the one usually quoted; the *Index Kewensis*, however, seems rightly to have used the first, as is shown by the reference to p. 393 under *Rosa hibernica*—a reference incorrectly changed in this Journal for 1907 (p. 304) to 394 (the page on which the plant occurs in the second edition). It may be pointed out incidentally that in the recent *London Catalogue* Smith is still given as the authority for this name, whereas that honour belongs of right to John Templeton (see *Journ. Bot.* l. c.).

F. G. Wiltshear.

SHORT NOTES.

Lathyrus tuberosus L. in Suffolk.—A specimen of this plant from the herbarium of Samuel Dale is in the British collection in the National Herbarium, inscribed in Dale's hand: "A R.° D.° Buddle multo ad hinc annis accepi qui in Agro Suffolckiæ invenit." A similar specimen is in Herb. Buddle (Herb. Sloane, 119, f. 23), but without locality. The plant is not mentioned in Hind's *Flora of Suffolk*, and was first recorded for the county last January (p. 31). It will be remembered that Buddle was living in Suffolk in 1698, and that he added several plants to the flora of the county—e. g. *Lathyrus palustris*, a specimen of which is on the same folio of Herb. Sloane, labelled: "I found it

under Burgh Castle, an old Roman fortification not far from Yarmouth;" *Medicago falcata* L., "in agro Suff. prope Orford frequens occurrit" with a variety "flore purpurascente, prope Dunwich Suff. collegi" (H. S. 119, f. 41); and *Lycopodium clavatum*, as to which and other plants of Lothingland in the county a note by Buddle, from H. S. 150, f. 46, is transcribed in this Journal for 1901, p. 72.—James Britten.

"Heredity of Acquired Characters" (p. 320).—I venture to suggest another explanation of Mr. Woodruffe-Peacock's interesting observation of Dandelions in clover and ryegrass following barley. It is clear that the sheep, in eating off all the Dandelions, had trampled completely over the area where they grew; sheep take much "exercise" during the day when grazing, and with their feet stamp all over the ground; they also lie heavily upon it when at rest. This must result in the flattening of the crowns of the Dandelion plants while the very young leaves and flower-stalks are in a tender and plastic condition, easily bent downwards and outwards from the centre. The procumbent flower-stalk eventually recovers sufficient energy to become ascending at the distal end, thus slightly raising the flower-head. A similar fact is noted by the Editor; here the mechanical pressure is applied by the lawn-mower and roller instead of by the sheeps' feet; this can be studied on any lawn, and is not explicable by animal influence. Moreover, it is not only plantains that are thus affected; but any of the lawn weeds, such as selfheal, hawksbit, cat's-ear, &c. This occurrence is especially noticeable when on account of dry weather a lawn is left unmown longer than usual; then the ascending flower-stalks are conspicuous, often describing a semi-circle. In conclusion, may I say that I fail entirely to see where the "heredity" of "acquired characters" comes in?—Eleonora Armitage.

"The Tea-tree."—The origin of this popular name for *Lycium chinense* Mill. is thus stated by Loudon—who refers the plant to *L. barbarum*, an error prevalent until recently—(*Arboretum*, iii 1269): "Commonly called the Duke of Argyll's tea tree, from the circumstance of a tea plant having been sent to the Duke of Argyll at the same time as this plant, and the labels having been accidentally changed." The person in question was Archibald, the third Duke (1682–1761), who had a garden and glasshouses at Whitton, near Hounslow, where he "collected all the foreign trees and shrubs which at that time were to be procured either at home or abroad" (*op. cit.* i. 58). The name first appears, so far as I have been able to ascertain, in Phil. Trans. xxviii. 220 (1713) where Petiver says: "I have as yet seen it only in the Bishop of London's garden at Fulham, where its call'd the Tea-tree"; Petiver's specimen of this is in Herb. Sloane 328, f. 107. Miller (Gard. Dict. ed. 7, 1759) says: "The seeds were brought [from China] to England a few years past and the plants were raised in several gardens, and by some were thought to be the *Thea*." Mr. Hemsley (Index Fl. Sinensis, ii. 175) says that the shrub is some-

times called "Lord Macartney's tea"—no doubt from some supposed connection with Macartney's embassy to China in 1792.—JAMES BRITTEN.

FRUCTIFICATION OF ELMS (p. 324).—The profuse fructification of the Wych Elm noticed by Mr. Melvill as occurring in Salop has not been this year confined to that county or to that species. Everywhere, among non-scientific as well as scientific observers, the remark has been common that the elms have killed themselves by fruiting. I have noticed trees of *U. glabra* Huds. leafless and apparently dead in the neighbourhood of Ross, Herefordshire, and in every other locality to which I have been, while most other individuals of this tree show only half or one-quarter of their ordinary leafage. Varieties of *U. campestris* L. (I believe *U. suberosa* (Moench), *U. stricta* (Lindl.), and *U. glabra* (Mill.)) have been in the same plight. In Normandy and Brittany I observed many trees of these elms apparently dead. *U. vegeta* Loudon, in Britain, is as bad; while the elm commonly called "type *campestris*" in Britain, although equally loaded with *samaræ*, has escaped evil effects by its habit of not ripening them. It would be interesting to discover the probable cause of this unnatural effort made by the elms in 1909.—AUGUSTIN LEY.

[We have received other communications on this subject, but the phenomenon seems to have been so general that it is unnecessary to publish them.—ED. JOURN. BOT.]

HYPOCHÆRIS GLABRA L. IN LANCASHIRE. — When recently looking over the *Compositæ* of my British herbarium, I came across a sheet of *Hypochæris glabra* L. labelled:—"Very scarce on sandhills at Ainsdale, S.W. Lancashire. Discovered as a native of that county by J. C. M., August 24th, 1878." Although this record is just thirty-one years old, I do not seem ever to have published it; but since the plant does not appear to have been noticed in the county by any subsequent observer during the interval—I particularly notice its absence from Wheldon & Wilson's *Flora of West Lancashire*—it seems well to send this note. I clearly recollect gathering it in one place only on the sandhills, and that at a point not very near the sea, in company with the late Mr. Hastings C. Dent, the main object of our search being *Erythræa latifolia* Sm., in which, needless to say, we were unsuccessful, though *E. littoralis* Fr. was unusually abundant and fine. The plant was in full flower, and evidently native in this locality.—J. COSMO MELVILL.

DEVON PLANTS: A CORRECTION.—Mr. Hiern has shown me that in my paper in this year's Journal, pp. 172-177, I have made a mistake in assigning the southern slopes of the Okehampton ridge of hills to the Watsonian vice-county 3, South Devon. He points out that, as the River Taw flows to the north coast, the whole of its valley really lies on the north side of Watson's imaginary boundary line; and that, consequently, all my Devon localities in that paper as being within the Taw Valley must belong to vice-county 4, Devon North. This gives a considerable

extension southwards of vice-county 4 as previously understood by me, and makes necessary the deletion of two of the "South Devon" entries in my records of Rubi (p. 312), viz. *R. cariensis* and *R. incurvatus*, which, however, can hardly fail to be found before long on the southern side of the boundary line as rightly defined.—W. Moyle Rogers.

Carex canescens L. var. tenuis Lang.—Mr. F. N. Williams (Journ. Bot. 1908, 371) gives only an English locality for the above; I first recorded it as British (Ann. Scot. Nat. Hist. (1897), p. 128) from Glen More, Inverness-shire, Dr. Lange having named the specimen. Buckinghamshire is one of the counties for which Mr. Williams has no record for the type; I have seen it near Black Park, where it was first noticed by the late Mr. Benbow. Now it is very rare or extirpated, but grows just outside the county boundary in a somewhat recently-planted wood (which may destroy it) near Aspley Guise, Beds.—G. C. Druce.

Tilia platyphyllos Scop. in Salop.—I found this tree in July this year on Wenlock Edge, Salop, in a steep wood, in a position where it is probably native; or at least utterly unlikely to have been planted. Records of distribution in Herefordshire have of late years gradually been extended from the lower Wye Valley northwards, and it is now known as a presumably native tree to the northern limits of the county. This makes the presumption that it is a native at Wenlock Edge, Salop, much more probable.—Augustin Ley.

New County Records.—During the Cotteswold Club's meeting at Builth, July 13 to 15, the following "new county records" (taking Top. Bot. and 1905 Supplement as the standard) were established:—For Breconshire (v.-c. 42), *Sedum purpureum* Tausch, *Campanula latifolia* L., and *Orobanche major* L. For Radnorshire (v.-c. 43), *Viola canina* L., *Polygala oxyptera* Reichb., *Valeriana dioica* L., *Lobelia Dortmanna* L., *Carex contigua* Hoppe, *C. inflata* Huds.—H. J. Riddelsdell.

REVIEWS.

The Botany of Worcestershire: an Account of the Flowering Plants, Ferns, Mosses, Hepatics, Lichens, Fungi, and Freshwater Algæ which grow or have grown spontaneously in the County of Worcester. With an Introduction and a Map. By John Amphlett, M.A., S.C.L. (of Clent), and Carleton Rea, B.C.L., M.A., with the assistance of many friends: the Mosses and Hepatics contributed by J. E. Bagnall, A.L.S., with later additions. Pp. viii, 651, cloth. Birmingham: Cornish, Ltd. 1909. Price 25*s*.

In this portly, well-printed volume the authors have brought together a great mass of material relating to the flora of an inland county, in which, however, owing to the salt-springs at Droitwich, a few maritime or semi-maritime species have been found. The

very complete bibliography of the county by the late Mr. W. Mathews (to whom the *Botany* is appropriately dedicated), which appeared in the pages of the *Midland Naturalist*, 1887–1892, has been incorporated. Very little was overlooked by that excellent and painstaking worker, with perhaps the exception of the few notices of Worcester plants which Geo. Don gave in his *Fasciculi*, some of which were the earliest for the county. A few plant records made since 1892 have been overlooked; the chief being the first mention of *Sagina Reuteri* as a British plant in the Bot. Exch. Rep. 1892, and in this Journal for 1894, 181; oddly enough it is called by the authors "alien: a new introduction," but it is found in quite natural conditions: a hybrid with *S. apetala* is mentioned.

Among the botanists specially connected with the county was Edwin Lees, who died in 1887, and of whom the present writer heard much of from the late Principal of Brasenose, Dr. Cradock, also a worker in Worcestershire, who added *Gagea* to its list. Lees was not in favour with H. C. Watson, to whom his garrulous and somewhat loose methods were especially repugnant. There was some reason for Watson's distrust; Lees knew some plants well, and could even appreciate minute differences in the *Rubi* at that date, when it required some courage to hint at anything beyond *R. fruticosus*; but he made identifications which could not be substantiated, some of which (e. g. *Andromeda*, *Genista pilosa*) help to swell the large number of errors and ambiguities which are thus entered in the *Botany*. Dr. Cradock said that whatever mistakes Lees made were accidental, and not wilful misrepresentation, and he spoke most highly of his uprightness. Another living botanist, Mr. R. F. Towndrow, who read the proof-sheets, has himself done most excellent work in the county, adding many critical forms to its list.

In the brief introduction a description of the physical characters of the county and its river drainage are given. For botanical purposes four divisions are made, two named after the rivers, the Avon and Severn which drain it, and two, the Malvern and the Lickey, so named from the two ranges of hills which diversify the surface.

One interesting feature of the work is the introduction under each species of a well-written popular account of the uses, history, folk-lore, &c., which will be appreciated by those to whom a bare list of localities would be *caviar*. A brief explanation of the derivation of the scientific names is also given.

The species are numbered throughout, the last in the first portion of the work being 1192, *Nitella opaca*. This large number strikes one with wonder, and the reader turns to the introduction for an explanation; but no table to show how these figures are arrived at will be found, nor any comparison with the flora of the neighbouring counties. On investigation it will be seen that, with the exception of a few casuals, every plant mentioned has been numbered, including not only the native species, denizens, colonists, and aliens, but also plants long ago extinct, if indeed

ever found, in the county, e.g. *Andromeda*; as well as others which have only been recorded for the neighbouring counties, e.g. *Isatis*, *Epipogium*, *Juncus tenuis*; undoubted errors, e.g. *Senecio paludosus* "by the roadside," *Cochlearia grœnlandica*, *Helianthemum polifolium*, *Kobresia*, &c.; some very dubiously belonging to Worcester, e.g. *Anemone Pulsatilla* and *Thlaspi perfoliatum*, and even purely alien species, e.g. *Azolla*.

For the sake of comparison I have made the following computation; but it must be borne in mind that the standard of species now is more generous than when Mr. Bagnall published his *Flora of Warwickshire*, whence the figures for that county are taken:—

	Worcester.	*Warwick.*
Natives and Denizens ...	898	859
Colonists	60	46
Extinct species	39	
	997	905
Aliens and Casuals	145	50
Errors	36	
Ambiguities	14	18
	1192	1073

In the *Flora of Hereford* 903 species of natives, colonists, and denizens are numbered. If the same standard of values were used in each case there would probably not be great difference in the numbers of the three counties. The authors certainly include many species which come very doubtfully in the category assigned them, e.g. *Bupleurum opacum* is called a colonist, *Atropa* a denizen; "casual" would surely better describe the first, and "alien" the second, since it is evidently only an introduction, even if remotely so.

The three species specially connected with the county are apparently extinct—*Pyrus domestica* (a seedling from which grows in the Oxford Garden) was wantonly destroyed in Wyre Forest in 1862, *Scirpus Holoschœnus* var., assuming the authenticity of Hudson's record, and the Wyre Forest *Spiranthes æstivalis*, the last date of its occurrence given being 1854. Nor are these all; drainage and cultivation are the chief factors which have led to the disappearance of the two species of *Elatine*, *Hypericum elodes*, *Lathyrus palustris*, *Cervicina hederacea*, *Vaccinium Vitis-idæa*, *Oxycoccus*, *Asarum*, *Eriophorum vaginatum*, *Asplenium viride*, *Cryptogramme crispa*, *Cystopteris*, *Phegopteris Robertiana*, *P. polypodioides*, and *Osmunda*. The extinctions and errors are in most cases enclosed in brackets in the *Botany*. Under *Phegopteris Robertiana* it is stated "true *calcarea* has yet to be found in the county," but in Top. Bot. that is given for "37 Worcester. Fraser sp.," which appears conclusive.

The niceties and intricacies of nomenclature do not appeal to the authors, in fact, they appear to scorn them, see note (p. 367)

under *Sparganium minimum*, in which they have quite misunderstood my contention about *S. natans*, nor have they correctly stated the facts. The same unacquaintance with recent nomenclatorial work is responsible for such a statement as may be found under (p. 146) *Sedum Telephium* "var. *purpureum* . . . not given in Lond. Cat. 10th Ed." It is there under the same name as their no. 397 *S. purpureum* Tausch, under which it is stated that "its identification must be received with caution. Neither *S. purpureum* Tausch or Linn. is mentioned in *Index Kewensis*." Varieties are not included in that work, so that var. *purpureum* L. is necessarily omitted. A still more curious note is to be found under *Festuca rottbœllioides* (p. 415), which is wrongly made synonymous with *F. arundinacea* Schreber, *F. pratensis* Huds., and *F. loliacea* Huds.! Purton's plant was almost certainly that hybrid grass *Lolium festucaceum*, certainly not the maritime *F. rottbœllioides* = *Desmazeria loliacea*, which is not at all likely to be found inland, and assuredly is not "general throughout the county"; as the authors say, "no doubt the synonyms given above are mixed up." *Chenopodium botryodes* Sm., said (p. 305) to have been recorded without locality by Lees in 1843 in Bot. Malv. Hills, 1843—it does not appear in the edition of 1868—and as a garden weed at Hagley Hall, &c., is hardly likely to occur on or near the Malvern Hills, or to appear in garden soil, as it is a salt-marsh species; but the authors cite as synonymous the non-British *C. Botrys* L., and Irvine is quoted later for the statement that *C. Botrys* "comes up every year spontaneously in the gardens at Hagley." The authors then go on to describe the plant, contrasting it with *C. rubrum*, to which *Botrys* bears no resemblance, and saying, "the extreme succulence of the flowers, and subsequently of the floral receptacle, strongly suggestive of the common strawberry"—a description which applies neither to *C. botryodes* or *C. Botrys*, but to the strawberry blite, *Blitum virgatum* L., now merged in *Chenopodium*.

The authors quote Mr. Mathews for the identification with *Lactuca saligna* of Merrett's "Lactuca sylvestris laciniata minima" —a most unlikely Worcester species—from Clinch Lench. The Morisonian name cited by Linnæus suggests as more probable a small form of *L. Serriola*, which formerly occurred in Worcester, if indeed it were not dwarf *L. muralis*, which still occurs in the vicinity.

But these are "flies in amber." British botanists are indebted to the authors for the production of a scholarly, cleanly printed, well-compiled account of the flora of an inland county which has curious natural features and some interesting species. They have not limited their enumeration to the phanerogams and fern allies, but have also included 293 species of mosses, and 76 hepatics—these elaborated by Mr. Bagnall—171 lichens, 65 algæ, and 1399 fungi—the very large number is no doubt largely due to the investigations of Mr. Carleton Rea, who, although this is not specially mentioned, is doubtless mainly responsible for this portion of the work; and have added materially to our knowledge of botanical topography.

G. Claridge Druce.

Œcology of Plants. By Eugene Warming, Ph.D., Professor of Botany, University of Copenhagen, assisted by Martin Vahl, Ph.D., &c.; prepared for publication in English by Percy Groom, M.A., D.Sc., &c., and Isaac Bayley Balfour, M.A., M.D., F.R.S., &c. Oxford: At the Clarendon Press. 1909. 8*s.* 6*d.* net cloth. Pp. xi, 422.

Ecology has been defined by Professor Haeckel as the science treating of the reciprocal relations of organisms and the external world. In this work, expressly prepared for English readers, Professor Warming deals exhaustively with the multitudinous adaptations whereby plants are accommodated to different soils and situations, as in water (Hydrophytes), soil exceptionally dry (Xerophytes), sour soils (Oxylophytes), saline soils (Halophytes), rock growths (Lithophytes), sand growths (Psammophytes), and so of others—Eremophytes, Psilophytes, Mesophytes, Chersophytes, Psychrophytes, Sclerophyllous Formations, &c., the nature of which may be gathered from the names by which they are designated. In each case minute particulars are furnished of the modifications of growth and structure by which plants are suited to get a living under the special conditions in which they are found.

To attempt any detailed examination of such a work would be possible only for one who had surveyed so vast a field with the knowledge and industry which the author brings to his task, for without such qualifications it would be a manifest impertinence to hazard an opinion upon the many points raised at every turn by one who is recognized as a foremost authority, and as having devoted himself with indefatigable zeal to questions which he has in a special manner made his own. It must suffice to say that here we have abundant material provided for those who desire to do practical work in this field, by paying our author the truest of compliments and subjecting his conclusions to the test of careful scrutiny in the light of observed facts.

One or two points raised of a more general character may be specially noted. In the first place, here is one which serves to make us realize how vastly complicated are the various factors of which the student of nature must take account, and how widely they often differ from what might naturally be supposed. We are thus told—and here is something which any observer may easily find occasion to examine—that sometimes a plant is found to flourish best under conditions which are not the most favourable for it, inasmuch as those which it would naturally prefer suit some rival species still better, which thus prevails in the struggle for existence. It is, for example, rather startling to be told (p. 367) "Alders attain their most luxuriant development on well-drained soil." The explanation follows, "but they are usually expelled from this by competing trees. Only in swamps, where they do not thrive so well, are they dominant. In like manner *Calluna vulgaris* flourishes upon rich soil better than on poor soil, but it is excluded from the former by competing species." Similarly we are told (p. 71), "When in Denmark we find the oak

growing sometimes on moist compact soil, and sometimes on dry poor soil, the reason for this is not that it prefers these soils, but that it is expelled from others by the beech."

On the larger question of the Origin of Species, Professor Warming speaks far more cautiously than do some who cannot claim equal authority. That the perfect harmony (or "Epharmony") by which species are adapted to their environment has arisen through some process of development or evolution he of course has no doubt; but what this process may have been he will not pretend to decide. As to the Darwinian explanation that all has resulted by the action of Natural Selection, he merely tells us: "This has recently been assailed on many sides, and does not find so many supporters as it did when first promulgated by Darwin."

Of the Mutation theory of Korschinsky and De Vries we read: "That new forms can arise by mutation [*i. e.* by sudden change] is a fact; but we do not yet know the extent to which they can differ from the parent-form, nor how far they are able to acquit themselves in their struggles with other forms."

The writer himself appears to incline towards a modified Lamarckism, according to which modifications are due to the action upon organisms of their environment, but with this important qualification, that these organisms "possess a peculiar inherent force or faculty by the exercise of which they directly adapt themselves to new conditions; that is to say, they change in such a manner as to become fitted for existence in accordance with their new surroundings."

The introduction of such inherent directive force is obviously directly at variance with the fundamental tenet of Darwinism. It seems very much like what Professor Henslow styles "adaptation," which might, we think, better be termed "adaptability."

JOHN GERARD.

The Young Botanist. By W. PERCIVAL WESTELL, F.L.S., and C. S. COOPER, F.R.H.S. With 8 coloured and 63 black and white plates drawn from nature by C. F. NEWALL. 8vo, cloth, pp. xxxvii. 199. Price 3*s.* 6*d.* net. Methuen & Co.

HERE is another addition to the already long list of books whose object is to provide young folk with an easy introduction to the knowledge of British plants. It is an attractive volume, well though extravagantly printed on good paper, nicely bound, and with a number of illustrations of varying merit, some good, some bad. So far as it goes, it is in the main accurate; the misfortune is that it does not go further. It is in fact one of the many books which a little more trouble and a fuller knowledge of what is wanted would have made thoroughly useful, and which make the reviewer regret that the authors did not see what to him is so apparent.

The title, to begin with, is misleading—or rather *un*leading; no one from it could judge what the book would contain: it

might be a general introduction, a handbook of plant physiology, or a popular summary of plant-lore. Being devoted to British flowering plants, it should at least have been comprehensive in that particular; but, although we are aware that "the young botanist" too often does not pursue his plant-hunting beyond the petaloid monocotyledons, it is regrettable that such a volume as this should afford him no opportunity of doing so—so far as the book is concerned pondweeds, sedges, rushes and grasses might have no existence.

The introductory matter, which includes a useful chapter on pollination and fertilization, is carefully done, although we fear the youthful student may be alarmed by the long list of terms and explanations and may want to "cut the cackle and come to the 'osses." But if he does he will soon be pulled up; for the descriptions are severely technical, and constant reference to the glossary— a good one—at the end of the book will be needed to make them intelligible to the tyro. The descriptions are accurate enough, but the space which is wasted in the method of printing them might have been devoted to useful information. It was surely unnecessary, seeing that it appears at the head of each page and each order, to repeat the ordinal name in a separate line after each plant. A short paragraph about the plants not especially treated should have been prefixed to each order, and some indication of related plants might usefully have accompanied the species described—*e. g.* the space occupied by the two species of *Plantago* (pp. 145, 146) is amply sufficient for the inclusion of the other three, and this applies equally to the Buttercups, Speedwells, and other genera. The information given under the head "salient features" is often useful, but not always accurate—*e. g.* it is impossible to suppose that *Veronica Beccabunga* is "often mistaken for Watercress," and if it were eaten no "dire results" would follow; evidently *Sium erectum* is intended. Notes on the names are often given under this heading; although on the whole they are fairly accurate, some should be accepted with caution, *e. g.* "the name *Alchemilla* is derived from Alchemy, in which science the plant was made frequent use of" (p. 65)—we take leave to doubt both these statements.

The illustrations, the coloured ones especially, are often extremely feeble, reminding us of those in Elliott's unsatisfactory edition of Johns's *Flowers of the Field*—we hope by the way that in recommending the new edition, "revised up to date," of this work (which is attributed to "Jóhn") the authors mean that issued by the S.P.C.K.; the threadlike stalks and stems of *Ranunculus bulbosus* and the Geraniums on plate 3 are examples of what we mean; the Charlock on plate 8 is unrecognizable. Surely, too, it was unnecessary to figure Shepherd's Purse and Groundsel? Some of the uncoloured plates are however quite good—*e. g.* the Wood Anemone and Mallow.

We are sorry we cannot speak more favourably of a book which might easily have been made as useful as it is in externals attractive.

BOOK-NOTES, NEWS, &c.

The fourth volume of the *Book of Nature Study*, edited by Dr. Bretland Farmer, M.A., D.Sc. (Oxon), F.R.S., &c., assisted by a staff of specialists (Constable & Co.), well maintains the character of those which preceded it. It is devoted to Botany, and comprises three very distinct parts. First we have a continuation from the preceding volume of "Some Common Flowering Plants" (Angiosperms), along with a special section on the "Scots Pine" —more commonly known as the Scotch Fir—to represent the Gymnosperms, and a useful arrangement of the plants described, in their families or natural orders. Next are treated the more notable Cryptogams—ferns, mosses and liverworts, higher fungi, moulds, yeast, bacteria. Finally, a most interesting chapter is concerned with woodland vegetation, plant association, and the vegetation of commons, heaths, and moors, in which students should find ample material to stimulate their powers of observation and suggest food for reflection. The illustrations are, as usual, very good and helpful, but we must express our preference for those in black and white; these, if less artistically finished, will, in our opinion, be found more practically useful than those in colour, which, however attractive, do not to our eyes always convey a right idea of the object represented: we would particularly indicate that of the potato (p. 6) and pear (p. 48) as failing in this respect. A word of special praise is due to the reproductions from photographs of trees and their bark.

We learn that a new Flora of Shropshire is in contemplation, to be undertaken by the Caradoc Club, of which our contributor Mr. J. Cosmo Melvill has recently been elected President. Leighton's admirable Flora of the county appeared in 1841, so there must be room for a new one.

Messrs. Swan Sonnenschein & Co. have in preparation the publication of a life of Sir Joseph Banks, on which Mr. Edward Smith has been for some time engaged. It would appear as if the claims of this eminent man to a fuller biography than has yet appeared were about to be fully recognized, for we learn from the *Journal of the West Australian Natural History Society* that Mr. J. H. Maiden also has a 'life' in preparation. Mr. Smith has gone carefully through the transcript of the Banksian Correspondence preserved in the Department of Botany, British Museum; this, curiously enough, is not mentioned in his prospectus, although it must go far to supplement any account which may be prepared without access to this important collection.

The sixth part of Mr. F. N. Williams's *Prodromus Floræ Britannicæ*, including the families of *Convolvulaceæ*, *Scrophulariaceæ*, *Orobanchaceæ*, &c., will be issued early in October. Intending subscribers are recommended to notify the publisher, Mr. C. Stutter, 110, High St., Brentford, Middlesex (or the author), as the number of copies printed is limited to the number of probable subscribers with a small margin.

The recent number (vol. ix. part 4) of *Hooker's Icones Plantarum* is almost entirely devoted to plates of species of *Sapium*, with descriptions by Mr. Hemsley. Botanists will be grateful for this elaboration of members of a critical and difficult genus—a continuation of the revision begun by Mr. Hemsley in earlier issues of the *Icones*—which has lately been the subject of descriptive papers in the *Bulletin de l'Herbier Boissier* for 1906 by Dr. Huber, of Para, the result of whose investigations to some extent anticipates Mr. Hemsley's work. The only other plant figured is *Manihot dichotoma* Ule, an important rubber-yielding species.

The latest number (vol. xxxix. n. 270) of the *Journal of the Linnean Society* contains among other matter of interest the paper by Mr. R. P. Gregory on the forms of flowers in *Valeriana dioica*, of which we gave an abstract on p. 80, and Dr. Börgesen discusses at length "a question of nomenclature" relating to *Fucus spiralis* L., which name he thinks ought to be retained.

Mr. J. H. Maiden publishes in the February issue (No. 6) of the *Journal of the West Australian Natural History Society* some interesting and useful "Records of Western Australian Botanists." As in other lists of the kind, the *Bibliographical List of British and Irish Botanists*, which first appeared in this Journal, has been taken as a model, and the information therein contained has been freely utilized. Of this the compilers are not likely to complain, but we think that suitable acknowledgement should be made when the account is textually transferred, as in the following instance—others might be cited:—

Biogr. Index.	Mr. Maiden.
"Backhouse, James (1794–1869), b. 8 July, 1794; d. York, 20 Jan. 1869. Nurseryman. Botanised in Teesdale, &c., 1803–65. Missionary Friend in Norway and the Southern Hemisphere. Correspondent of J. E. Smith & W. J. Hooker."	"Backhouse, James (1794-1869). Born 8th July, 1794; died at York, England, 20th January, 1869. Nurseryman. Botanised in Teesdale, Yorkshire, etc., 1803–65. Missionary Friend in Norway and the Southern Hemisphere. Correspondent of J. E. Smith & W. J. Hooker."

The compilation of the *Biographical Index*, of which a new and revised edition is in contemplation, was a work involving much time, labour, and research, and in common fairness those who make use of it should acknowledge their indebtedness.

We regret to announce that Mr. W. E. St. John Brooks has been compelled by ill-health to resign his assistantship in the Department of Botany, British Museum.

We regret to record the death of Mr. Robert Morton Middleton, of whom we hope to publish some account later.

Mr. Britten leaves the Department of Botany on Sept. 20, having completed forty years as a Civil Servant. All communications for him personally or for this Journal should be addressed to 41 Boston Road, Brentford, Middlesex.

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Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

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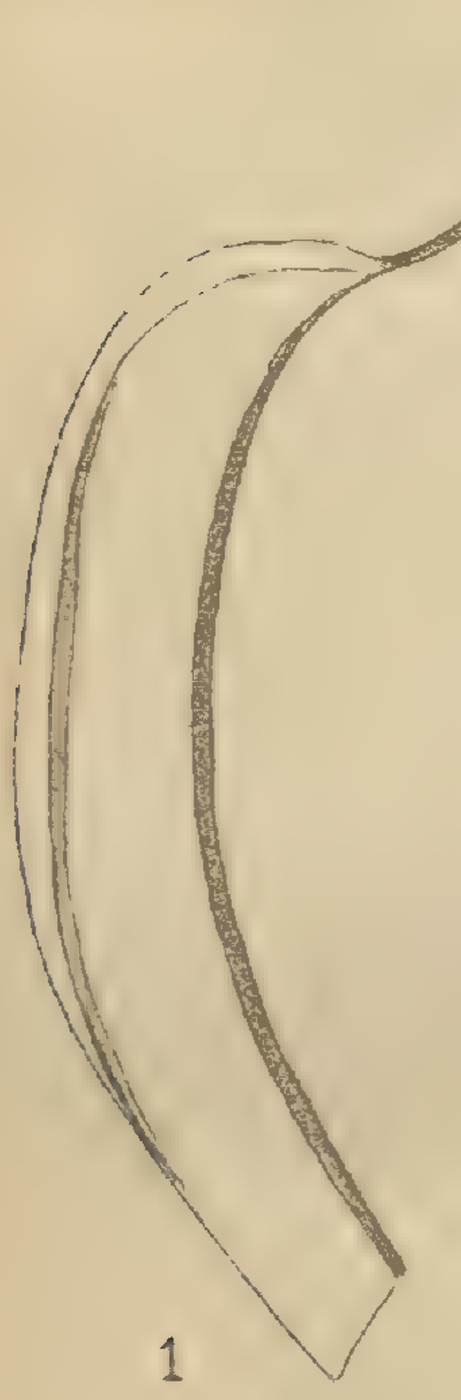

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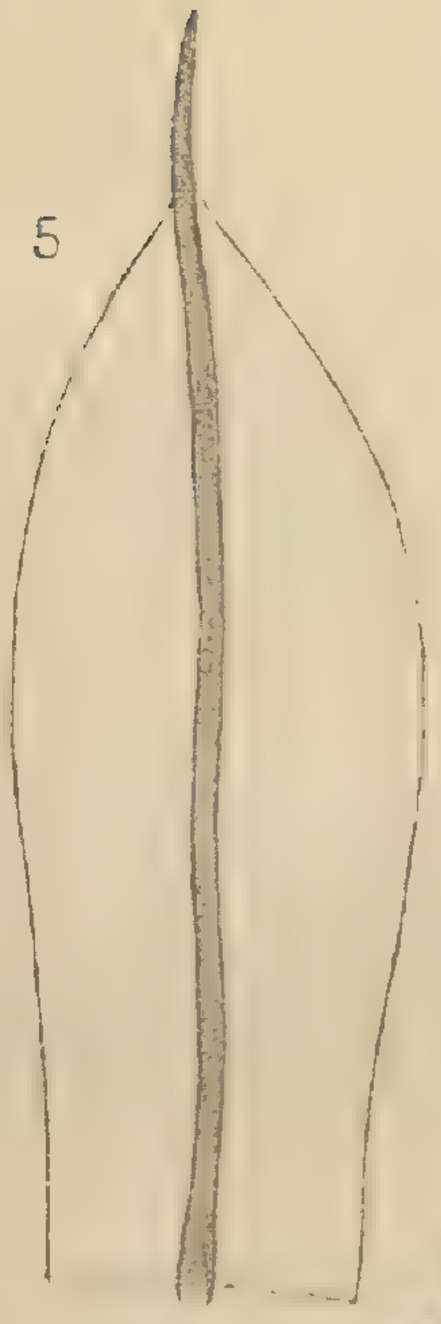

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Figs 1–4, Tortula aciphylla *Hartm.*
Figs 5–7, Atlantic Islands Mosses.

CONTRIBUTIONS TO THE MOSS-FLORA OF THE ATLANTIC ISLANDS.

By H. N. Dixon, M.A., F.L.S.

(Plate 499, Figs. 5–7.)

I. Madeira.

A collection of mosses made in Madeira by Miss Eleonora Armitage in the early months of 1909 was entrusted to me for naming. The collection included some 180 numbers, and, as will be seen, yielded several interesting additions to the flora of the island. The following appear to be new to Madeira, those which, to the best of my knowledge, are unrecorded from the Atlantic Islands being indicated by an asterisk:

**Pleuridium subulatum* Rabenh.
**Dicranella heteromalla* Schp.
Dicranella canariensis Bryhn
Fissidens incurvus Starke
Fissidens atlanticus Ren. & Card.
Grimmia trichophylla var. *meridionalis* Schp.
Grimmia azorica Ren. & Card.
Barbula cylindrica Schp.
**Weisia crispata* C. M.
Weisia calcarea C. M.
Weisia calcarea C. M. var. *mutica* Boul.
Trichostomum mutabile var. *littorale* Dixon
Trichostomum flavovirens Bruch
Orthotrichum Lyellii Hook. & Tayl.
Bryum capillare L.
Bryum erythrocarpum Schwaeg.
Brachythecium rutabulum B. & S.
Eurhynchium circinatum B. & S.

I have to thank M. Cardot for very kind assistance given in the determination of certain critical plants.

Miss Armitage has been so good as to furnish the following topographical notes, which will be found to supplement the list of localities in a very valuable way:—

"During my stay in Madeira, from January 6 to March 16 this year (1909), I tried to explore parts of the island for bryophyta, but found much hindrance both from the configuration of the country and from the climatic conditions prevailing at that time.

"Madeira, being one of the Atlantic Islands, lies 320 miles off the coast of Africa; Funchal, on the south, being situated in latitude 32° 37′ N., and longitude 17° W. It is roughly pear-shaped, the elongated stalk pointing east, and is about thirty miles by twelve; it is the summit, the last 6000 ft., of a huge volcanic mountain, rising from the immense depth of 13,000 ft. from the bed of the Atlantic. The gradient is extremely steep everywhere, the island rising as one mountain-block culminating in a number of peaks from 5500 to 6000 ft., at a distance of only six miles from the sea, the sides being deeply seamed with precipitous ravines. Much of the country is thus rendered inaccessible, and all difficult.

"The mean annual rainfall of Madeira is 30 inches, most of

which falls in the winter, snow lying for a couple of months on the mountain tops; this year, in February and March, the rainfall was excessive, two inches in a single day falling on one or two occasions during the latter month, at the same time that the extraordinary snowfall occurred over Europe. The temperature, too, was considerably below the average, the mean winter temperature being 60° F.; but this year on several nights it fell to 44°–46° F., with day maxima of 60°–64° F., thus producing a mean temperature of 52·5° F.–55·5° F.

"These untoward weather conditions put a stop to long walks, especially as there was an almost constant pall of thick, white mist which condensed on the mountain-tops and rolled down to about 4000–2500 ft. Each time that I climbed to the Poizo Pass, 4550 ft., to ascend to higher elevations, I was enveloped in this drenching cold mist, through which it was impossible to see anything or to proceed at all.

"My gatherings are therefore mostly between 1500 and 4000 ft. on the south side of the island; aridity and cultivation preventing the growth of bryophyta below 1000 ft. in most parts. Polytricha, Campylopi and Hypnaceæ were mostly found about the oak and pine (*Pinus pinaster* Ait.) plantations; *Hypnum canariense* (Mitt.) on the ground among grass at about 3000 ft.; *Leucodon Treleasei* (Card.) Par. on rocks; Brya on rocks, either dry or moist; *Haplodontium Notarisii* (Mitt.) Broth., only on vertical rocks over which there was a constant drip of water; *Bryum canariense* Schwaeg. on drier rocks in the Ribeiras (ravines); Ptychomitria on the basaltic rocks, where I was interested to find growing also *Bartramia stricta* Brid. and the hepatic *Targionia hypophylla* L. in close association, as I had found them on the similar rock at Stanner in Radnorshire; *Philonotis rigida* Brid. on damp earth by the Levadas (aqueducts); Fissidentes on earth in shade; Funariaceæ on earth in sun; Grimmiæ and Rhacomitria on the higher open mountain sides; Weissiæ and Amphoridium on walls and rocks; Trichostoma on earthy banks; while at high elevations, 4000–4500 ft., growing as epiphytes on trees of *Laurus canariensis* and on the large bushes 3–5 ft. high of *Vaccinium maderense*, were *Orthotrichum Lyellii* H. & T., *Ulota calvescens* Wils., and *Antitrichia curtipendula* Brid."

The following is a list of species, with the localities:—

Pleuridium subulatum Rabenh., *c. fr.* Monte, nr. Funchal (no. 6). Poizo Pass (no. 106). New to the Atlantic Islands.

Ceratodon purpureus Brid., *st.* A pale green form, with the nerve of the upper leaves excurrent. Possibly var. *canariensis* Schiffn. Ribeira de S. Luzia (no. 13). Poizo Pass, 4000 ft. (no. 33).

Dicranella heteromalla Schp. ♂. Damp wall, Funchal (no. 10). Appears to be new to the Atlantic Islands. A very interesting form, owing to the presence of dark, reddish-brown, translucent bulbils on the radicles and in the axils of the lower

leaves. Somewhat similar bodies (Wurzelknöllchen of Correns) have been recorded from several species of *Dicranella* upon the rhizoids; but according to Correns (*Vermehrung der Laubm.*, 337) these have not been observed upon *D. heteromalla*, while so far as I am aware they have hitherto been found confined to the rhizoids at the base of the stem; in the present case they occur in that position, but the axillary ones are much more numerous and more conspicuous. They are more regular in form than the ordinary Wurzelknöllchen, being oval or obovate, multicellular bodies, each terminal on a slender, articulate, axillary stipes of varying length, radicular in character, but quite different in structure from the ordinary rhizoid. They develop directly into shoots, which in this case, so far as I have seen, all terminate in ♂ flowers, and several of these branches or innovations may be seen in different stages of development, proceeding from the axillary bulbils on an older stem. (Plate 499, fig. 7.)—*D. canariensis* Bryhn, *st.* Caminho do Conde de Carvalhal, 500 ft. (no. 107). I have not seen a specimen of Bryhn's plant, but from the description I do not think there can be any doubt of the determination. New to Madeira.

Campylopus fragilis B. & S., *c. fr.* Monte (no. 11). Sparingly fruiting.—*C. polytrichoides* De Not., *c. fr.* Monte (no. 12). A single stem only was found fruiting, though capsules were sought for carefully by Miss Armitage. The capsules are furrowed when dry, as is the case with specimens recently collected by Dismier in the Pyrenees; indeed, the idea that the capsule in *C. polytrichoides* is smooth appears (as shown by Luisier) to have arisen from examination of imperfect specimens. As also the degree of furrowing of the dorsal surface of the nerve appears to be variable it would seem that *C. Tullgreni* Ren. & Card. can no longer be held specifically distinct from *C. polytrichoides.* Ribeira de S. Luzia (no. 111). ♂. This has the leaves practically smooth at back of nerve, so that it would belong to *C. Tullgreni* Ren. & Card., but as noted above this can hardly be maintained as a species. Monte, ♀ (nos. 112, 113).

Fissidens viridulus Wahl., *c. fr.* Monte (no. 14*a*).—*F. incurvus* Starke, *c. fr.* Caminho do Palheiro, Funchal, 1500 ft. (no. 20). New to Madeira.—*F. atlanticus* Ren. & Card., *st.* Monte 2000 ft. (no. 15). An interesting extension of the range of this newly described species, hitherto recorded only from the Azores.—*F. serrulatus* Brid. Palheiro, Funchal, 1800 ft., *c. fr.* (no. 16). Monte, *st.* (no. 17).—*F. taxifolius* Hedw. Monte, *st.* (nos. 18, 81).—*F. pallidicaulis* Mitt., *st.* A few sterile stems of this were mixed with *F. viridulus* (no. 14*b*). I should be inclined to refer *F. taxifolius* var. *tenuis* Bottini to this species.

Grimmia trichophylla Grev., *st.* With *Rhacomitrium heterostichum*, Poizo Pass (nos. 116, 117).—Var. *meridionalis* Schp. (*G. Lisæ* De Not.). Monte (no. 19) *st.* Tall. Leaves squarrose, margins widely recurved. These characters, by which the plant is distinguished from *G. trichophylla*, are those of *G. Lisæ* De Not. as I understand it, which I think Husnot is undoubtedly

right in reducing, with Schimper, to a variety of the very variable *G. trichophylla*. In fact, considering the great variability of the leaf form and direction, together with that of the basal cells, I am strongly inclined to group as varieties or sub-species of one type (*G. trichophylla*), *G. Lisæ*, *G. subsquarrosa*, *G. Stirtoni*, and *G. azorica*, the first three forming a chain of which *G. Lisæ* forms one and *G. Stirtoni* the other extreme. Nor do I think that *G. canariensis* Schp. can be separated from *G. trichophylla* var. *meridionalis*, i.e. *G. Lisæ*. I have examined the specimen in Schimper's Herbarium at Kew (Husnot, Pl. Canarienses, 1866, no. 181*a*), and I can see nothing in its vegetative characters beyond a tall, robust form of *G. trichophylla* with long, recurved leaves as in var. *meridionalis*. Whether or not it should be referred to that variety must depend on the value to be attributed to the fruiting characters of the variety as defined by Schimper, which I have not studied.

The var. *meridionalis* has not been recorded from Madeira.

G. azorica Ren. & Card., *st.* Curral das Freitas, 3000 ft. (no. 22). New to Madeira.

Rhacomitrium aciculare Brid. Poizo Pass, 4000 ft., *st.* and *c. fr.* (nos. 24, 115*a*).—*R. heterostichum* Brid. Poizo Pass, 4000 ft., *st.* (nos. 25, 116). Choupana Downs, Poizo Pass, 3500 ft., *st.* A form with the branches suberect and fastigiate, probably owing to their being embedded in fine, sandy earth (nos, 26, 27). Poizo Pass, 4000 ft., *c. fr.* (nos. 118, 119, 120). — *R. canescens* var. *ericoides* B. & S., *st.* Poizo Pass, 4000–4500 ft., *st.* (nos. 28, 121).

Ptychomitrium polyphyllum Fürnr., *c. fr.* Monte (no. 29), Poizo Pass, 4000 ft. (nos. 122, 123).—*P. nigricans* Schp., *c. fr.* Monte (nos. 30, 124). Curral dos Romeiros, Monte, 2000 ft. (no. 125). Caminho do Palheiro, 1500 ft. (no. 126).

Hedwigia ciliata Ehrh., *c. fr.* Poizo Pass (no. 31).

Timmiella Barbula Limpr., *c. fr.* Curral das Freitas (no. 45).

Tortula muralis Hedw., *c. fr.* Monte (no. 32). Caminho do Conde de Carvalhal, Funchal (no. 127).

Barbula cylindrica Schp. (*B. vinealis* var. *cylindrica* Boul.), *c. fr.* Monte (no. 9). This appears to be new to Madeira, though *B. vinealis* has been recorded.

Weisia crispata C. M., *c. fr.* Caminho do Palheiro, Funchal (no. 35). Curral dos Romeiros, Monte (no. 128). No. 35 has the peristome very slightly developed, but reddish in colour; the leaves wide and sub-obtuse, nerve 50–60 μ wide, often slightly reddish; not quite typical *W. crispata*, though entirely different from *W. viridula* as found in Madeira. No. 128 is well marked and undoubted *W. crispata*. This species appears to be quite new to the Atlantic Islands.—*W. viridula* Hedw., *c. fr.* Monte (no. 36). S. Martinho, Funchal, 850 ft. (no. 129).—*W. calcarea* C. M., *st.* Shady wall, Funchal, 100 ft. (no. 130). Resembling *W. tenuis* in habit, but the cells for the most part remain quite short to the leaf base.—*W. calcarea* var. *mutica* Boul. Wall, S. Antonio, Funchal, *c. fr.* (no. 37). Fossil beds, Caniçal (no. 38),

an immature growth, probably referable to this variety. Both type and variety are new to Madeira.

Eucladium verticillatum var. *angustifolium* Jur., *st.* Curral dos Romeiros (no. 40).

Trichostomum crispulum Bruch. Caminho do Palheiro (no. 41), with setæ.—*T. mutabile* Bruch. Neves, near Funchal, 1000 ft., *c. fr.* (no. 34). Near Camacha, 3500 ft., *c. fr.* (no. 42). Monte, *st.* (no. 43). Caminho do Meio, Funchal, 900 ft., *st.* (no. 44). Caminho do Palheiro, Funchal, *st.* (nos. 46, 134). Ribeira de S. Luzia, *st.* (no. 47). Near Camacha, *c. fr.* (no. 48). Curral dos Romeiros, Monte, *st.* (no. 49). S. Martinho, Funchal, *st.* (no. 133). Curral das Freitas, *st.* (no. 135). Ribeira de Joao Gomes, Monte, *c. fr.* (no. 136). *T. mutabile* appears to vary considerably in Madeira, showing far greater latitude, if all the above plants are correctly referred to it, than even in its European forms. Nos. 43 and 46, for example, have the leaf apex and cells almost identical with *T. tenuirostre* Lindb., and exhibit a peculiar arrangement of the basal cells. The hyaline cells do not terminate obliquely upwards (as in *T. flavovirens*, &c.). but one or sometimes two marginal rows rise much higher than the rest, forming an extremely narrow hyaline border for some distance up the leaf. This character is shared with nos. 44 and 47, and as 47 has the leaf apex and areolation of ordinary *mutabile*, I think nos. 43 and 46 must be referred there also. No. 44 presents additional differences, the leaf being much longer and narrower than in typical *T. mutabile*. It is not *T. cirrifolium* (Mitt.), but may perhaps be referable to var. *nigro-viride* Card.—*T. mutabile* var. *littorale* (Mitt.) Dixon. Ribeira de S. Luzia, *st.* (no. 21). Caminho do Palheiro, *st.*, with *T. crispulum* (no. 41). New to Madeira.—*T. flavovirens* Bruch., *st.* Monte (no. 132). Not quite one of the ordinary forms, having the dry leaves closely contorted as in *T. nitidum*, but with the larger cells and cucullate apex of *T. flavovirens*. New to Madeira.

Anœctangium compactum Schwaeg., *st.* Ribeira de S. Luzia, 2000 ft. (nos. 39, 131).

Amphoridium curvipes (C. M.) Jaeg., *c. fr.* Ribeira de S. Luzia, 2000 ft. (nos. 8, 108, 109, 110). Curral das Freitas (no. 50).

Ulota calvescens Wils., *c. fr.* On *Vaccinium maderense*, 4550 ft., Poizo Pass (no. 51). On laurels, 3500–4000 ft., Poizo Pass (nos. 52, 53, 137).

Orthotrichum Lyellii H. & T., *st.* On laurels, Poizo Pass (no. 54). New to Madeira.

Entosthodon Templetoni Schwaeg., *c. fr.* Ribeira de S. Luzia (no. 55).

Funaria hygrometrica Sibth., *c. fr.* Caminho do Conde de Carvalhal, Funchal, a form with short seta (no. 56). S. Roque, Funchal (nos. 138, 140). Damp wall, Funchal (no. 139). Camara de Lobos (no. 141).

Haplodontium Notarisii (Mitt.) Broth., *c. fr.* Miss Armitage made four gatherings of this rare and interesting species, always

on vertical rocks kept constantly moistened. Ribeira de S. Luzia (no. 67). Monte (nos. 157, 158). Curral dos Romeiros, Monte (no. 162).

Webera sp. On earth, near Camacha, circa 1800 ft. (no. 68). This is either a form of *W. elongata* Schwaeg. or a nearly allied species. It must remain, for the present at least, undetermined. —*W. Tozeri* Schp. Monte, 2000 ft., *c. fr.* (no. 75). Caminho do Conde de Carvalhal, Funchal, *st.* (no. 76). Curral das Freitas, 3000 ft., *c. fr.* (no. 153). Near Camacha, 2500 ft., *c. fr.* (no. 167). Pico das Rosas, Monte, 2500 ft., *c. fr.* (no. 168). Fonte, Monte, 2000 ft., *c. fr.* (no. 169).

Brachymenium Philonotula (Hampe) Broth. Caminho do Conde de Carvalhal, Funchal, circa 300 ft., *c. fr.* (no. 57). Luisier (*Bull. de la Soc. Portug. des Sci. Nat.*, Lisbonne, 1907, i., 71) records this species as collected by M. Menezes " à Calheta, près de Funchal, 1866." It was submitted to M. Cardot, who informs me that he was unable to discover any differences of importance from Hampe's plant, known hitherto only from Madagascar and Usambara. Miss Armitage's plant is the same as that gathered by M. Menezes, and the localities are quite distinct and about ten miles apart. The capsules are numerous, but unfortunately in an immature condition, with one or two exceptions. The peristome appeared to me to show certain characters distinct from *B. Philonotula* as figured by Renauld in Grandidier, *Hist. Physique de Madagascar*, xxxix. pl. 64, but the importance of this and other slight differences can hardly be gauged without reference to actual specimens, and I am quite content for the present at least to accept the original determination as made by M. Cardot.

Anomobryum juliforme Solms. Monte, *st.* (no. 61). Curral das Freitas, *c. fr.* (no. 147). Caminho do Conde de Carvalhal, Funchal, *st.* (no. 148).

Bryum pseudotriquetrum Schwaeg. Monte, *st.* (no. 62). Curral das Freitas, ♂ (no. 149).—*B. canariense* Schwaeg., *st* Monte (no. 66), Curral das Freitas, *st.* (no. 160). Whatever may be the case with the inflorescence, I can find no vegetative differences of any constant value between *B. canariense* and *B. provinciale*.—*B. capillare* L., *c. fr.* Monte, 2000 ft. (No. 64). Appears to be unrecorded from Madeira.—*B. platyloma* Schwaeg. Ribeira de S. Luzia, *c. fr.* (no. 73). Caminho do Conde de Carvalhal, Funchal, 300 ft., *c. fr.* (no. 151). Ribeira de S. Luzia, 1800 ft., *c. fr.* (no. 152). Curral dos Romeiros, Monte, 2000 ft., *st.* (no. 154). Curral das Freitas, 3000 ft., *c. fr.* (no. 155). Curral dos Romeiros, *c. fr.* (no. 161). Nos. 73 and 161 differ somewhat from the ordinary form, having the border less strongly marked, and leaves more flaccid, in fact approaching *B. capillare* more closely.—*B. Donianum* Grev., *c. fr.* Monte, 3000 ft. (no. 65). Curral das Freitas, 3000 ft. (No. 153).—*B. atropurpureum* W. & M., *c. fr.* Caminho do Conde de Carvalhal, Funchal (no. 69).—*B. erythrocarpum* Schwaeg., *c. fr.* On walls, Monte (no. 70). Wall near S. Antonio, Funchal, 900 ft. (no. 163). New to Madeira. Recorded from the Canaries by Bryhn * (as *B. bicolor*

* *Bryophyta Archipel. canariensis*, Trondhjem, 1908.

Dicks.). It is not noted by him as new, but I am not aware that it was recorded previously for the Atlantic Islands.—*B. murale* Wils. ♂. Damp wall, Caminho do Conde de Carvalhal (no. 7). —*B. alpinum* var. *meridionale* Schp., *st.* Curral das Freitas (no. 164). Poizo Pass (no. 165). Monte (no. 166).—*B. gemmiparum* De Not., *st.* Levada above Monte, 3000 ft. (No. 63). Ribeira de Joao Gomes, Curral dos Romeiros (no. 71).—Curral dos Romeiros, Monte, 1500 ft. (no. 150). Monte (no. 159).—*B. argenteum* L., *st*, Monte (no. 72).

Bryum sp. Curral das Freitas, 3000 ft. (no. 153*bis*). A small quantity of a sterile *Bryum* must remain undetermined, but it is quite unknown to me, resembling *B. Mildeanum* in miniature, but with much smaller leaf-cells, the margin narrowly recurved, nerve red, decidedly excurrent; plant of a vinous red tinge.

Mnium undulatum L., *st.* Monte, 2000 ft. (n. 74).

Bartramia stricta Brid., *c. fr.* Monte (nos. 142, 145). Curral dos Romeiros, Monte (no. 143).

Philonotis rigida Brid., *c. fr.* Caminho do Conde de Carvalhal, Funchal (no. 58). Monte (nos. 59, 144). — *P. marchica* Schp., forma, *st.* Curral das Freitas (nos. 60, 146). A dense, small plant, with rigid, somewhat catenulate stems, which I was unable to identify. M. Cardot, however, informs me that it belongs to *P. marchica*, of which he has several specimens from Madeira.

Pogonatum nanum P. Beauv. Curral das Freitas, 3000 ft., *st.* (no. 2). Poizo Pass, 4550 ft., *c. fr.* (no. 100). — *P. aloides* P. Beauv., *c. fr.* Monte, 3000 ft. (no. 101). Poizo Pass, 4000 ft., a form with short seta (no. 102).

Polytrichum piliferum Schreb., *c. fr.* Monte (no. 3). Curral das Freitas (no. 103). — *P. juniperinum* Willd. Monte, 2500 ft., *c. fr.* (no. 4). Boca dos Namorados, Funchal, 3500 ft., *st.* (no. 104). —*P. commune* L. Levada, near Camacha, *st.* (no. 5). Poizo Pass, towards Ribeiro Frio, 3500 ft., *st.* (no. 105).

Leucodon Treleasei Paris (*Astrodontium Treleasei* Card.) var. *latifolium* Card., *c. fr.* Shady rock, Monte, 1800 ft. (no. 77). With three capsules. From the somewhat more robust habit, longer seta (12–15 mm.), and peristome teeth divided above into two short *crura*, I judge this to belong to var. *latifolium* Card., described from specimens collected near Funchal in 1890 by M. Menezes.

Antitrichia curtipendula Brid., *st.* Poizo Pass, 4550 ft. (nos. 78, 170).

Homalothecium sericeum B. & S. Poizo Pass, *c. fr.* (no. 172). Curral das Freitas, *c. fr.* (no. 173), a robust form. Boca dos Namorados, 3000 ft., *st.* (no. 181). — Var. *Mandoni* (Mitt.) Ren. & Card., *st.* Monte (no. 79). Laurels, Poizo Pass, 4550 ft., *c. fr.* (no. 171).

Brachythecium rutabulum B. & S. Monte, *c. fr.* (nos. 80, 81). Near Camacha, *st.* (no. 174). I believe this species is not at present recorded from Madeira. — *B. rivulare* B. & S., *st.* Above Caminho do Meio, 2000 ft. (no. 98).—*B. illecebrum* De Not. Near

Camacha, *st.* (no. 83). Monte, *c. fr.* (no. 84). Boca dos Namorados, 3000 ft., *st.* (nos. 85, 181). Ribeira de S. Luzia, *st.* (no. 90). Caminho do Palheiro, Funchal, *st.* (no. 175).—*B. purum* Dixon, *st.* Boca dos Namorados (no. 177). Monte (no. 178). Above Caminho do Meio, 2000 ft. (no. 179).

Eurhynchium circinatum B. & S., *st.* Monte (no. 88). Caminho do Conde de Carvalhal, Funchal (no. 89). New to Madeira.—*E. prælongum* B. & S. (*E. Swartzii* Hobk.), *st.* Monte (no. 87).—*E. Stokesii* B. & S. (*E. prælongum* (L.) Hobk.), *st.* Above Caminho do Meio (no. 86). Poizo Pass, 3500 ft. (no. 180).—*E. confertum* Milde, *c. fr.* Boca dos Namorados, 3000 ft. (no. 81). Monte (no. 82). Caminho do Palheiro, Funchal (no. 176).

Hypnum riparium var. *longifolium* B. & S., *c. fr.* Monte (no. 91). An aquatic form with rather long-pointed leaves is perhaps best referred to the above variety.—*H. cupressiforme* L., *st.* Monte (nos. 92, 182). Poizo Pass (no. 96).—Var. *ericetorum* B. & S., *st.* Above Caminho do Meio, 2000 ft. (no. 95).—Var. *filiforme* Brid., *st.* Rocks near Caminho do Meio (no. 93). Poizo Pass (no. 183). These two plants have the leaves sharply denticulate, as in var. *mamillatum*, but the habit is more that of var. *filiforme*. They are probably identical with those from La Palma, Canaries, referred to by Schiffner (*Hedwigia*, xli. 293).—*H. canariense* (Mitt.) Jaeg. & Sauerb., *st.* Monte (no. 94). Boca dos Namorados, 3000 ft. (nos. 97, 181).—*H. cuspidatum* L., *st.* Ribeira de Joao Gomes, Monte (no. 99).

II. Azores.

During a visit to the Azores early in 1909, Mr. G. C. Druce made a small collection of mosses which he sent to me to identify. Although the number of specimens was quite small, scarcely in fact exceeding a dozen in all, they contained a good deal of interest, including an undescribed species, and two other forms hitherto unrecorded from the Azores. They were all collected on S. Miguel.

The following are new to this group of islands:—

Timmiella Barbula Limpr.
Barbula gracilis var. *viridis* B. & S.
Bryum clavatulum Card. & Dixon, n. sp.

The complete list is as follows:—

Sphagnum subnitens Russ. & Warnst., *st.*

Campylopus polytrichoides De Not., *st.* Scarcely referable to var. *sublævipilus* Kindb. (Rev. Bry. 1898, 91), although on some of the stems the leaves have the hair-points smooth.

Timmiella Barbula Limpr., *c. fr.* A few stems, mixed with *Barbula vinealis*. New to the Azores (*cf.* Cardot in Bull. de l'Herb. Boissier, 1905, p. 206).

Tortula muralis Hedw., *c. fr.*

Barbula vinealis Brid. In tuft of *Festuca*, on wall, Ponte Delgada. A form approaching var. *cylindrica* (*B. cylindrica* Schp.), but nearest, I think, to *B. vinealis*.—*B. gracilis* var. *viridis* B. & S., *c. fr.* A small gathering of a fruiting *Barbula* showed a close

relationship to *B. gracilis*, while differing in the chlorophyllose cells, with thinner walls, the margin more strongly reflexed to near apex, together with a rather narrower capsule having the cells of the exothecium larger and longer than in that. According to Limpricht the structure of the exothecium varies somewhat in different varieties of *B. gracilis*, while I have myself seen forms with the margin reflexed exactly as in this plant, so that I have no hesitation in referring it to the var. *viridis*, with which the character of the areolation and the form of capsule agree. Both species and variety are new to the Atlantic Islands apparently.—*B. convoluta* Hedw. In good fruit.

Trichostomum mutabile var. *littorale* Dixon (*T. littorale* Mitt.), *st.* Recorded, as *T. mucronatulum*, in Eighth Ann. Report of Missouri Bot. Garden, 1897, p. 57. *T. mucronatulum*, however, proves to be only a slender form of this plant.

Bryum murale Wils., *c. fr.* The leaf margin is rather widely recurved, a character which I have noticed in other southern specimens from Tunis, Algeria, and Madeira.

Bryum (§ Erythrocarpa) **clavatulum** Card. & Dixon, n. sp. Dense lateque cæspitosum, 2 cm. altum, molle, *nitidum*, læte-virens foliis interdum rufescentibus, inferne fuscum, radiculis dense minute papillosis parce intertextum. Caulis in sectione subpentagonus, ·3 mm. crassus, cellulis fasciculi centralis distincti (·08 mm.) multis, parvis, tenuibus, ceteris laxis, externis in 1–2 seriebus incrassatis, parvis, coloratis. Folia apud apices ramorum *sensim majora densiora* (dehinc caules *clavatuli*), sat conferta, erecto-patentia, haud decurrentia, subconcava, ovato-lanceolata, acuta, superiora tantum breviter acuminata, *nervo excurrente longe cuspidata*, 2–2·5 mm. longa, ·5–·75 mm. lata, margine *omnino plano vel inferne leniter angustissime recurvo*, haud limbato, integro vel ad apicem subdenticulato. Costa *valida*, ad folii insertionem 60–85 μ lata, ætate rubens, in cuspidem robustam, integram, substrictam, ·25 mm. longam excurrens, dorso prominens, in sectione cellulas ventrales duas magnas, duces (basin versus) subæquales 2-3, fasciculum comitum parvum, stereidearum sat validum, cellulas dorsales plus minusve incrassatas circa decem præbens. Cellulæ folii *valde chlorophyllosæ*, *viridissimæ*, basales numerosæ rectangulares, laxæ, superiores anguste rhomboideo-hexagonæ, 60–85 μ longæ, 12–16 μ latæ, parietibus tenuibus firmis, marginem versus sensim angustiores, externæ in 1–2 seriebus sæpe lineares, nec tamen limbum distinctum formantes.

Cetera ignota. Inter Erythrocarpa et Alpiniformia ludens.

Hab. S. Miguel, Azores, 1909; leg. Druce. (Plate 499, figs. 5, 6.)

Although only a single tuft was gathered in the sterile state, the characters seem sufficiently marked to warrant its determination as distinct from any known European or West African species. In habit it forms a link between the *Erythrocarpa* and *Alpina* groups, being more robust and with larger leaves than is usually the case with the former, while it differs from the latter in the less firm foliation with longly excurrent nerve. The leaves indeed

are almost identical with those of *B. gemmiparum*, but for the long, cuspidate nerve point, and the occasionally acute denticulation of the apex; the comal leaves are, however, usually more acuminate. The large leaves, stout, longly cuspidate nerve, absence of bulbils, and plane or almost plane margins, distinguish it from any of the *Erythrocarpa* group of this part of the world.

Philonotis rigida Brid., *c. fr.*

Polytrichum commune L., *st.*

Thuidium tamariscinum B. & S. A single stem amongst *Sphagnum subnitens*.

Hypnum cupressiforme L., forma. A pale green, tumid form, robust, closely pinnate; leaves large but not wide, thin, not chlorophyllose, alar cells *few*, hyaline, rather small. Sterile.

Explanation of Plate 499.—Fig. 5. *Bryum clavatulum*, n. sp., leaf, × 30. Fig. 6. Ditto, part of leaf apex, × 250. Fig. 7. *Dicranella heteromalla*, part of stem showing axillary bulbils and rhizoid, × 60.

TORTULA ACIPHYLLA IN BRITAIN.

By W. E. Nicholson.

(Plate 499, Figs. 1–4).

When botanizing among the fallen boulders above Loch na Chat on Ben Lawers in the early part of last June I came upon a small patch of a moss which looked strangely familiar to me at first glance, though on reflection I recognized that it was not in Britain that I had made its acquaintance. A glance with a lens at the leaves revealed the longly excurrent reddish points of the nerves of the leaves, and at once showed the plant to be *Tortula aciphylla* (B. & S.) Hart; a moss widely distributed in the mountains of Central Europe, the Pyrenees, and Scandinavia, and found also in North America, but not hitherto recorded for Britain.

T. aciphylla may be distinguished from *T. ruralis* (L.) Ehrh., to which it is closely allied, by the more acuminate leaves, by the brighter green colour of the upper leaves, the more vinous red tint of the lower ones, and, above all, by the fact that the nerve is excurrent in a nearly smooth reddish bristle instead of the spinose, hyaline hair point of *T. ruralis*. The capsule, too, is rather shorter and stouter than in the latter moss, but this character is rarely available. Only a single small patch was found growing with *Madotheca rivularis*, *Swartzia montana*, and *Mnium lycopodioides*; the last moss seems to be not uncommon on this side of Ben Lawers, where it is probably often overlooked, either as a sterile form of *M. serratum* or a small form of *M. spinosum*.

Wahlenberg, in his *Flora Carpatorum principalium* (Göttingen, 1814), treated our moss as a variety (*β alpina*) of *ruralis*, but most

subsequent authors, with the exception of De Notaris, have considered it as distinct. My own experience of it in the field would lead me so to regard it for all practical purposes, though in company with Mr. H. N. Dixon I gathered at Maristuen in Norway in July, 1900, a specimen in which the characters are to some extent intermediate, especially in the fact that the upper portion of the excurrent nerve is colourless and very spinose. I have also seen a specimen from North America with a tendency in the same direction, but such forms are, I believe, scarce, and are probably more often met with in localities of comparatively low elevation, in which the moss but rarely occurs.

The species as a whole is characteristically alpine, and is rarely found in Central Europe below the tree line, while *T. ruralis* is rare or only occurs in starved forms, not approaching *T. aciphylla*, in such situations. The Ben Lawers plant in any case is quite unequivocal, and belongs to the typical alpine form of the species.

According to Lindberg the plant is identical with *Syntrichia norvegica* F. Web. in Web. & Mohr; if so, it should be called *Tortula norvegica* (Web. fil.) Wahlenb., and this view has been accepted by most Scandinavian bryologists. Limpricht, however, seems to throw doubt on this identification, and I have followed the general Continental usage in adopting the specific name given to the species by the authors of the *Bryologia Europæa*.

EXPLANATION OF PLATE 499.—Figs. 1, 2, *Tortula aciphylla*, Ben Lawers, leaves, × 30. Fig 3, do. leaf apex, × 100. Fig. 4, *T. ruralis*, leaf apex, × 100.

NEW CHINESE PLANTS.

BY S. T. DUNN, B.A., F.L.S.

Microtropis reticulata, sp. n. Frutex 3–6 ped. alta, sepalis exceptis omnino glabra, cortice rubro-griseo, ramulis striatis. Folia opposita, lanceolata, integra, margine revoluta, 2–4 pol. longa, chartacea, supra lucida, apice basique obtuse acuminata, venis lateralibus utrinque 8–10, venulis supra minus, infra magis elevato-reticulatis, petiolis, 2–3 lin. longis. Flores in pedunculis brevissimis capitati fasciculos densos multiflores axillares formantes; squamis multis parvis ovatis crassis bracteati; sepala 5, valde imbricata, ovata, $\frac{3}{4}$ lin. longa, margine ciliata, obtusa; petala 5, oblonga, 1 lin. longa; stamina extra discum annularem 5-lobatum membranaceum affixa, sepalis æqualia, filamentis brevissimis, dilatatis; ovarium imperfecte 2-loculare, ovale obtuse acuminatum, ovulis erectis, stigma capitatum breviter bilobum. Capsula $\frac{3}{4}$ pol. longa, elliptica, valvis duobus, coriaceis, striatis, de semine deciduis; semen unicum, rubrum, post valvorum delapsum persistens, albumine copioso corneo, embryone centrali, cotyledonibus planis foliaceis.

CHINA: Island of Lantao at 1000 feet, on exposed rocky slopes, Colony of Hongkong, *Dunn*, March, 1909, Hongkong Herb. n. 6436.

This is the third species of the genus which has been discovered during the last few years in this neighbourhood, the other two being *M. fokienensis* Dunn from Fokien Province and *M. latifolia* Wight from Hongkong Island. The presence of fruit in the specimen described above leaves no doubt as to its generic identification.

The same certainty cannot be claimed for the assignment of *Gymnosporia variabilis* Loes. (Hupeh), *Elæodendron Fortunei* Turcz (China), *Elæodendron japonicum* Sieb. and Zucc. (Hongkong), to the genera mentioned, as their fruit is unknown. Now that two undoubted *Microtropis* are recorded for China (*M. reticulata* with fruit and *M. latifolia* matched with fruiting Indian specimens), it is not unlikely that all may prove to be congeneric and that the genus *Elæodendron* may have to resume its northern limit as regards Asia in the hot plains of India.

Hedyotis Matthewii, sp. n. Herba præter corollam glabra, erecta, 1–2 ped. alta, ramulis quadrangularibus. Folia breviter petiolata, lanceolata, $1\frac{1}{2}$–$2\frac{1}{2}$ pol. longa, chartacea, longe acuminata, basi cuneata, venis obscuris utrinque 3; stipulis late triangularibus, integris. Flores 3–4 lin. longi, paniculam terminalem plusminus foliatam formantes; bracteis parvis subulatis; pedicellis floriferis calycem paullo excedentibus, fructiferis elongatis, calycem semel vel bis excedentibus; calycis dentes tubo bis breviores; corolla tubus calycis dentes haud superans, lobis lanceolatis, intus barbatis, tubum bis vel ter excedentibus; stylus exsertus; capsula 2 lin. longa, dentibus conniventibus ter longior, crustacea, ovalis; semina minuta angulata.

China: Kwangtung, Lienchow River, collected on Fleet-Surgeon C. G. Matthew's Lienchow Expedition in December 1907, Hongkong Herb. n. 5042.

Very near *Hedyotis tenuipes* Hemsl. but at once distinguished by its elongated capsules and shorter pedicels. The capsules of *H. tenuipes* which were gathered by the writer among the Yenping Mountains (Fokien) in 1905 are didymous and do not exceed the calyx-teeth in length.

Lasianthus areolatus, sp. n. Arbor parva, ramulis strigosis mox glabris. Folia lanceolata, integra, 4–6 pol. longa, chartacea, supra glabra, subtus in venis strigillosa, longe acuminata, basi cuneata vel rotundata, venis lateralibus utrinque 6-8, arcuatis, intra marginem anastomosantibus, itaque areolas 1–2-seriales formantibus, venulis transversis crebris, parallelis carentibus, petiolis brevibus, stipulis ex setis paucis brevibus formatis. Flores 2–3-ni in axillis fasciculati, subsessiles, 6–7 lin. longi; calyx subtruncatus, obscure 5-dentatus, sparse strigosus; corolla calycem 5–6-natim superans, anguste infundibuliformes, lobis 4, patentibus, valvatis, partem quartam tubi æquantibus, intus pubescentibus; antheræ inclusæ; stylus tubum corollæ superans, in stigmata 4–5 breviter fissus.

China: Fokien, woods at 3000 feet in the Yenping Mountains, *Dunn*, Hongkong Herb. n. 2806.

Piper Matthewii, sp. n. Frutex scandens omnino glabra cortice griseo. Folia alterna, lanceolata, integra, 2–4 pol. longa, membranacea, opaca, apice acuminata, basi obtusa, venis literalibus majoribus utrinque duobus supra impressis, infra elevatis, acute ascendentibus, in venas intramarginales crebre arcuatas gradientibus, petiolis 5–8 lin. longis. Spicæ in fructu oppositi foliæ, 2–4 pol. longæ, ½ pol. latæ, pedunculo ½–1. pol. longo. Baccæ sessiles globosæ, 1–1½ lin. longæ, leves, pericarpio tenuiter carnoso; bracteis peltatis.

China: Kwangtung, Lienchow River, Fleet Surgeon *C. G. Matthew*, R. N., December, 1907, Hongkong Herb. n. 4987.

Near *Piper Chaba* Hunter, but differing in its cylindric spike.

Quercus litseoides, sp. n. Arbor sempervirens parva sed robusta, 3–8 ped. alta, glabra, ramulis, griseo-corticatis, novellis striatis. Folia subsessilia, cuneato-elliptica, integra, margine revoluta, 1–3 pol. longa, crasse coriacea, supra lucida, infra opaca, apice rotundata, basi cuneata vel breviter acuminata, venis lateralibus utrinque circiter septum infra paullo elevatis, petiolo crasso 1 lin. longo. Spicæ solitariæ, in axillis summis dispositæ; femineæ ½–1 pol. longæ apice 2-4-floræ; masculæ 1–2 pol. longæ multifloræ, laxæ, pendulæ; glandes juvenes in pedunculo circiter 3, solitariæ, squamatæ, stylis 3, recurvis, stigmate capitato.

China: Lantao Island at 1000 feet on exposed rocky slopes, Colony of Hongkong, *W. J. Tutcher*, March, 1909, Hongkong, Herb. n. 6437.

The specific name is suggested by the close superficial resemblance of the tree to *Litsea chinensis* in all but its flowers.

A POINT IN NOMENCLATURE.

By A. B. Rendle, D.Sc., and James Britten, F.L.S.

Dr. Lindau in the last issue of Engler's *Jahrbuch* (xliii. 352), refuses to accept the name *Physacanthus* for a genus of *Acanthaceæ* published by Bentham (Gen. Pl. ii. 1085) in 1876, on the ground that the two species indicated by him as belonging to it were "unknown" ("unbekannt"); we presume Dr. Lindau means unnamed and undescribed.

There is nothing in the International Rules to support this view; on the contrary, the first example there given of the valid publication of a genus—*Carphalea* Juss. (Gen. Pl. 198, 1789)—corresponds in every respect with the publication of *Physacanthus*, the genus being established on an unnamed dried specimen collected by Commerson in Madagascar.

Dr. Lindau prefers to retain his own name *Haselhoffia*, described in 1897 (in Engl. Jahrb. xxiv. 316), the identity of which with *Physacanthus*, which he retained in his account of *Acanthaceæ* in the *Pflanzenfamilien* (iv. 3B, 307, 1895), he had not observed; this was first pointed out by C. B. Clarke in Flor. Trop. Afr. v. 57 (1899).

If this view be maintained a large number of genera must fall, including *Carphalea*. Again it cannot be supposed that the mere addition of an unpublished trivial name for a plant assigned to the genus can be held to validate the description of the genus—*i. e.* wherein *Physacanthus* Benth. differs from the numerous new genera established in the *Genera Plantarum* where such specific names are added, e. g. *Tamatavia*, *Placocarpa*, and *Nematostylis* of Hook. fil. in *Rubiaceæ*—genera which are universally maintained.

The three species now known of the genus may be thus distinguished:—

Stem creeping	*P. nematosiphon.*
Stems erect.	
Calyx in fruit inflated . . .	*P. batanganus.*
Calyx in fruit scarcely inflated .	*P. cylindricus.*

The synonymy is as follows:—

PHYSACANTHUS BATANGANUS.

Ruellia batangana J. Braun & K. Schum. in Mittheil. Deutsch. Schutzg. ii. 173 (1889).

Lankesteria batangana Lindau in Pflanzenfam. iv. 3B, 311 (1895).

Haselhoffiia leucophthalma Lindau in Engl. Bot. Jahrb. xxiv. 316 (1897).

Physacanthus inflatus C. B. Cl. in Fl. Trop. Afr. v. 57 (1899).

Haselhoffia batangana Lindau in Engl. Bot. Jahrb. xliii. 352 (1909).

P. CYLINDRICUS C. B. Clarke in Fl. Trop. Afr. v. 58 (1899).

H. cylindrica Lindau, *l. c.*

P. NEMATOSIPHON.

H. nematosiphon Lindau, *op. cit.* 351.

NOTES ON THE FLORA OF DORSET.

By the Rev. E. F. Linton, M.A.

The north-east corner of Dorset, of which Cranborne is the centre and the principal village, has not been worked out, and since my last paper (Journ. Bot. 1904, 236) on the Dorset Flora, several plants worth noting have been met with, and some species and varieties have been added to the county list. These are marked with an asterisk.

Most of the following notes refer to this area, in District F, an area with no stream larger than a large brook, the River Cran, but with varied soil, heathland and chalk being divided by an irregular band of the London and Reading beds; a mixture which is very favourable to variety as well as profusion of flowers. The seven Districts of the County are lettered A to G; and F may be understood wherever no letter is prefixed to localities. Under *Gramineæ* a number of localities have been supplied me by Mr. H. J. Goddard, whose initials denote his contributions. He has

kindly sent me specimens of several of the more critical species, and I add ! after species or localities of which I have seen specimens. I think those which I have not seen may be accepted as correct.

Thalictrum flavum L. Edmondsham.—*Adonis autumnalis* L. Reported to me as having been found at Cranborne by Mrs. Head. —*Ranunculus Lingua* L. Near High Hall, *Canon E. R. Bernard*. —*R. sardous* Crantz. Goatham and Rumford, two hamlets of Edmonsham.—*Aconitum Napellus* L. In the borders of a field near the Deer Park, St. Giles, hardly native.

Berberis vulgaris L. In a hedge not far from a cottage, and *Papaver Rhœas* L. var. *strigosum* (Boenn.), both in Edmondsham. —**Fumaria Borœi* Jord. D. Wareham. F. Shapwick; Parkstone. No localities are given for this species in Fl. Dorset, though it is mentioned as "rare." It is, however, probable that most of the localities stated for *F. confusa* Jord. should be transferred to *F. Borœi*. Specimens of the plant common through south-east Dorset, which we were calling *F. confusa*, were renamed by Mr. Pugsley as above. — *Var. *serotina* Clavaud. D. Wareham.—*F. densiflora* DC. D. Entrance to Lytchett Bay, *L. V. Lester-Garland*. F. Goatham.—**F. parviflora* Lam. F. Arable field near Badbury Rings, the late *Rev. R. P. Murray*. Bell Salter's notice of this species, without specimen and without locality, is so uncertain, that I mark this as a new record for the county.—*Erophila verna* E. Meyer. D. Wareham. F. East of Almer.—*Var. *stenocarpa* (Jord.). Down, north-east of Handley. —*E. præcox* DC. Old wall, Wimborne; a form, Edmondsham, on gravel path.—*Erysimum cheiranthoides* L. Edmondsham, very scarce.—*Coronopus didymus* Sm. Alien, Edmondsham.—*Lepidium ruderale* L. Mount Pleasant, Horton, introduced probably with chicken's food.—**Bunias orientalis* L. Roadside near the 'Black Horse,' Baileygate, *R. P. Murray*.—*Raphanus maritimus* Sm. A. Near Charmouth, by the shore. The record for the county has been questioned, but I obtained a root from this locality to grow, and proved it correct. The plant grew very strong in my garden for one season, and was exterminated by the turnip-fly.

Helianthemum Chamœcistus Mill. is said in the Flora to be common and generally distributed. This is true on the chalk, but on the extensive heathland of East Dorset it is absent.—*Viola calcarea* Gregory. G. Sent me from near Swanage, by Mr. Bolton King; flowers violet.—*Polygala serpyllacea* Weihe. Edmondsham and Goatham.—*P. calcarea* F. Schultz. Harley Down, near St. Giles; Bottlebrush Down, near Cranborne.

Saponaria officinalis L. Edmondsham. — *Silene latifolia* Rendle & Britten, b. *puberula* Syme. Near St. Giles; Shillingstone.—*Cerastium arvense* L. Besides the three localities for Dorset criticised by Miss Roper (Journ. Bot. 1906, 281) there were recorded in the Fl. Bournemouth (1900) two others, *viz.*, Talbot, where it occurred in sandy turf, and near Creech Grange, in Purbeck, where it appeared to me native on the verge of a

cultivated field. I may now add F., chalk down between St. Giles and Handley.—*Moenchia erecta* Gaertn., Mey & Scherb. D. Hamworthy. F. Sutton Holms; Goatham.—*S. umbrosa* Opiz. Edmondsham.

Malva moschata L. Edmondsham, also with white flowers.—*M. rotundifolia* L. Cranborne, very scarce.—**M. pusilla* Sm. was well established for some years on waste ground, Edmondsham, but lately overlaid with rubbish and soil and destroyed.—*Tilia cordata* Mill. Chalbury.—*Geranium pratense* L. Meadow by the Stour, south of Hod Hill.—*G. pyrenaicum* L. Blandford to Pimperne, and lane on towards Stourpain Down.—*G. columbinum* L. Blagdon Farm, Cranborne; Edmondsham.—*G. lucidum* L. Edmondsham.

Rhamnus catharticus L. Hedges near St. Giles and near Pentridge; near Cashmoor Inn.—*R. Frangula* L. F. Goatham; Verwood; Edmondsham. A. Near Monkton Weald, the late *F. T. Richards*. The name of Mr. Richards, who was a Fellow of Trin. Coll. Oxford, appears in the Flora under various disguises—Richard, Rickard, Rickards, and sometimes with a wrong initial—mistakes which the author told me were due to misreading the notes sent him. These names all denote one botanist, who, though he accumulated no herbarium, was a keen observer, and often visited Dorset in summer vacations.

Genista anglica L. Goatham.—*G. tinctoria* L. An abundant weed in rough pastures between Edmondsham, St. Giles and Woodlands.—**Medicago lappacea* Desr. Poole, probably a casual, *Dr. D. T. Playfair*!—*Trifolium subterraneum* L. Castle Hill, Cranborne; half a mile north of Blandford.—*T. medium* L. Edmondsham, very local.—*T. striatum* L. Castle Hill, Cranborne.—*T. scabrum* L. G. Seacombe.—*T. glomeratum* L. Near Edmondsham, scarce.—*T. fragiferum* L. Edmondsham, rare so far inland.—*T. filiforme* L. Edmondsham, and near Westworth; half a mile north of Blandford.—*Anthyllis Vulneraria* L. Near Blagdon Farm, Cranborne; Harley Down and Sovell Down, near the Gussages. — *Lotus hispidus* L. G. Goatarne, *L. V. Lester-Garland*.—*Hippocrepis comosa* L. Harley Down.—*Onobrychis viciæfolia* Scop. Down near Blagdon Farm, Cranborne, possibly native.—*Lathyrus montanus* Bernh. var. *tenuifolius* Roth. Near Edmondsham, rare compared with the type.

Prunus spinosa L. *var. *macrocarpa* Wallr. Near Woodlands, and Edmondsham, detected by the Rev. A. Ley.—*Spiræa Filipendula* L. Harley Down; down half a mile east of Handley: Thickthorn Down; Stourpaine Furze.

Rubus idæus L., *R. plicatus* Wh. & N., *R. Lindleianus* Lees (frequent), *R. pulcherrimus* Neuman, *R. nemoralis* P. J. Muell., *R. leucandrus* Focke, *R. rusticanus* Merc., *R. macrophyllus* W. & N., *R. leucostachys* Schleich., *R. dumetorum* W. & N., *R. cæsius* L., all occur in Edmondsham.—*R. affinis* W. & N. Lilliput; between Bailey Gate and Foxholes Wood.—*R. rhamnifolius* W. & N. Heatherlands; Lilliput; Foxholes Wood.—*R. mucronatus* Blox. var. *nudicaulis* Rogers. Martin Wood, near Cranborne. To this

variety probably all the localities in the Fl. Dorset may be assigned.—*R. Bloxamii* Lees. Abundant on the eastern side of Edmondsham, *i. e.*, on the lighter soils.

Geum rivale × *urbanum* (*G. intermedium* Ehrh.). On the verge of moist woodland in two spots in Edmondsham, where both parents cohabit.—*P. procumbens* Sibth. F. Edmondsham. G. Seacombe.—*P. argentea* L. Castle Hill, Cranborne.—*Agrimonia odorata* Mill. In two or three spots in Edmondsham.—*Poterium polygamum* Waldst. & Kit. Relic of cultivation, Edmondsham.—*P. officinale* A. Gray. G. Seacombe.

. *Rosa spinosissima* L. D. Trigon to Wareham.—*R. tomentosa* Sm., *R. rubiginosa* L., *R. micrantha* Sm., *R. tomentella* Leman, *R. obtusifolia* Desv., *R. lutetiana* Leman, *R. dumalis* Bechst., *R. urbica* Leman, *R. systyla* Bast., and *R. arvensis* Huds., all occur in Edmondsham.—*R. dumetorum* Thuill. D. A little north of the railway, Wareham. F. Edmondsham.

Pyrus Aria Ehrh. About Cranborne, rather infrequent; in Cranborne Chase, more common, including many large old trees. —*P. Malus* L. Both varieties, Edmondsham.

Ribes rubrum L. and *R. nigrum* L. By the rivulet, Edmondsham, possibly from garden seed carried down by the stream, or else by birds. The var. *petræum* Sm. of the former occurs about Corfe Mullen.—*Sedum Telephium* L. Edmondsham.—*S. album* L. On a cottage roof, Edmondsham.—*S. dasyphyllum* L. had spread in 1906 over cottage roofs, near my original locality on a wall, in Blandford, and was very flourishing.—*Callitriche stagnalis* Scop., *C. hamulata* Kuetz, and *Peplis Portula* L. occur in Edmondsham. —*Epilobium hirsutum* L. C. On the east side of Dorchester, white-flowered, *Miss Inglis*.—*E. lanceolatum* Seb. & Maur. Weed in a garden at Seldown, Poole.—*Apium inundatum* Reich. fil. Goatham; Verwood.

Carum segetum Benth. & Hook. fil. Hedge-banks, Barnfield, Edmondsham; more easily detected in the early spring than in summer, and readily distinguished then by the leaves of seven to ten pairs of neatly serrate leaflets from *Sison Amomum*, whose leaflets are in three to four pairs, and coarsely dentate.—*Œnanthe pimpinelloides* L. Roadside turf and pastures, Edmondsham; Woodlands; locally abundant on stiffer soils and alluvial valleys, but absent from the lighter soil of the heathland.—*Œ. Lachenalii* C. Gmel. F. Lilliput, near Poole Harbour; near Edmondsham. G. Seacombe to Dancing Ledge; by the Corfe River.—*Silaus pratensis* Bernh. A troublesome weed in pastures, Edmondsham, deep-rooting, and not easily got rid of.—*Caucalis arvensis* Huds. Chalky fields on the west side of Edmondsham, scarce.

Adoxa Moschatellina L. Sparse in Edmondsham, in profusion on open hedge-banks, Cranborne.—*Viburnum Opulus* L., in the valleys, and *V. Lantana* L., in hedgerows and thickets on the chalk, Edmondsham.

Galium Cruciata Scop. Frequent in most parts of Dorset, except on the heathland; is strangely absent from the whole Cran-

borne neighbourhood.—*G. verum* L., *G. Mollugo* L., *G. saxatile* L., *G. palustre* L., *G. uliginosum* L., and *G. tricorne* L., all occur in Edmondsham; also *Asperula odorata* L., in plenty.—*A. cynanchica* L. Stourpaine Furze Down; Knowlton; Harley Down; downs near Cranborne and Pentridge.

Valeriana dioica L. Meadows, Edmondsham; Cranborne; Verwood.—*V. officinalis* L., *V. sambucifolia* Mikan., *Valerianella dentata* Poll., Edmondsham. — *Scabiosa Columbaria* L. Not infrequent on the chalk, Edmondsham; Cranborne; Gussage All Saints.

Solidago Virgaurea L. Remarkably abundant in woods on stiff clay, Edmondsham; Cranborne.—*Bellis perennis* L. A discoid form, on a hedge-bank between Wimborne and White Mills.—*Filago minima* Fr. Parkstone; field-way between Edmondsham and Verwood.—*Inula Helenium* L. G. Church Knowle, *E. R. Bankes.*—*I. Conyza* DC. Cranborne.

Anthemis arvensis L. Parkstone; Edmondsham; Blagdon Farm, Cranborne.—*Chrysanthemum Parthenium* Bernh. Rumford.—*Tanacetum vulgare* L. E. River Stour banks, Shillingstone. F. Edmondsham.—*Petasites ovatus* Hill. D. South of Bere Regis, with huge leaves, some of them four feet wide and four feet high. F. St. Giles.—*Carlina vulgaris* L. "Everlasting Thistle," locally, Edmondsham; downs about Cranborne.—*Cnicus pratensis* Willd. Frequent in wet meadows, Edmondsham; between Cranborne and Verwood.—*C. acaulis* Willd. Edmondsham; downs near Cranborne; St. Giles' Park.—*Silybum Marianum* Gaertn. C. Puddletown, *Miss Northcote.* F. West Parley, *Rev. R. A. Chudleigh.*—*Centaurea Calcitrapa* L. West Parley, 1900, *Rev. R. A. Chudleigh.*

Cichorium Intybus L. Edmondsham.—*Picris hieracioides* L. Chettle; Cranborne.—*P. echioides* L. C. Osmington; F. Borders of Edmondsham and St. Giles. G. Seacombe.—*Crepis taraxacifolia* Thuill. Edmondsham; gradually spreading in the county.—*Hieracium Pilosella* L. *var. *concinnatum* F. J. Hanb. Edmondsham, and a detached portion of Gussage All Saints.—*H. sciaphilum* Uechtr. *var. *transiens* Ley. Shady lane by the saw-mill, between Cranborne and Verwood.—*H. rigidum* Htn. var. *trichocaulon* Dahlst. Banks in Edmondsham and Goatham.—*Lactuca muralis* L. Cranborne; Edmondsham.

Jasione montana L. Goatham. — *Campanula glomerata* L. Gussage St. Michael; Thickthorn Down. — *C. Trachelium* L. G. Near Norden Farm, along the base of the down, in plenty.—*Legousia hybrida* Delarbre. F. Cranborne Farm. G. Norden Farm.

Monotropa Hypopitys L. In a copse on the southern borders of Edmondsham.

Limonium recurvum C. E. Salmon. C. This has been reported as almost quarried away (Journ. Bot. 1907, 412); but last year Mr. W. Bowles Barrett made careful search for me, and besides the old station which is nearly destroyed by quarrying, he happily sent specimens of this species, which were confirmed by Mr. C. E.

Salmon, from two other spots. There is therefore no immediate fear of its extinction by quarrymen.

Primula veris × *vulgaris*, *Lysimachia vulgaris* L., *Anagallis cærulea* Schreb. (in a cottage garden) occur in Edmondsham. — *Centunculus minimus* L. Edmondsham; also near the saw-mill; near Verwood Station.

Blackstonia perfoliata Huds. Near High Hall, *Canon E. R. Bernard.* Horton; not uncommon in Edmondsham.—*Gentiana Pneumonanthe* L. Goatham, and still more abundant some two miles further east towards Somerley.— *G. Amarella* L. Old chalk-pit, Edmondsham; down near Cashmoor Inn. The Compton Abbas locality in the Flora under C is near Shaftesbury and in District E.—*G. campestris* L. occurs within a few miles, at Breamore Down, South Hants, but I do not find it yet within the county.

Pulmonaria angustifolia L. F. Specimens have been brought me from Sutton Holms. G. Mr. E. R. Bankes tells me that "Pullington" Farm in the Flora of Dorset should be Rollington Farm.—*P. officinalis* L. survives as a relic of cottage gardens which have become a wilderness on the borders of Edmondsham and Cranborne, and is locally known as "Joseph and Mary."—*Myosotis repens* G. and D. Don, *M. scorpioides* L., *M. collina* Hoffm., *M. versicolor* Sm., all in Edmondsham.—*Lithospermum officinale* L. Edmondsham; south end of Hamildon Hill.—*L. arvense* L. Edmondsham; this flowers most years as early as April.

Cuscuta Epithymum Murr. Goatham.—*C. Trifolii* Bab. Holwell near Cranborne. The entries in the Flora of *C. europæa* L. "on vetches" and "on clover" look suspicious. Does *C. europæa* ever grow on these leguminous plants? *Atropa Belladonna* L. In some quantity on waste ground within the limits of Charborough Park; specimens sent me by the Rev. J. Cross, 1908.—*Datura Stramonium* L. Bourne Valley, and Branksome Park, near Bournemouth; Edmondsham, once in a garden.

Verbascum nigrum L. F. Boveridge; Chettle; Handley.—*V. Blattaria* L. Chettle, *E. F. W. Castleman.*—*Linaria cymbalaria* L. C. Osmington. F. Edmondsham.—*L. spuria* Mill., *L. Elatine* Mill., *L. minor* Desf., Edmondsham.—*Antirrhinum Orontium* L. D. East Morden. F. Birches Copse near Edmondsham. —*Veronica montana* L. Moist woodland, Edmondsham.—*V. scutellata* L., *V. Anagallis-aquatica* L., and var. *anagalliformis* (Bor.), all in Edmondsham.—*Euphrasia nemorosa* H. Mart. Holwell; Edmondsham abundant; Mount Pleasant, Horton.—*E. curta* Wettst. var. *glabrescens* Wettst. Verwood to Horton; Hilly Rimes, Edmondsham. **E. occidentalis* Wettst. F. Hemsworth Down, north of Badbury. G. By Littlesea.—*Bartsia Odontites* Huds. *var. *divergens* Jord. Along the Wimborne Road, Edmondsham.—*Rhinanthus major* Ehrh.? A solitary plant in a cultivated field, Westworth, Edmondsham, appeared to be this species, while in the adjoining meadows *R. Crista-Galli* was the common plant. Having met with a similar case at

Shapwick, Somerset, I cannot help wondering whether the common species of the meadows can be stimulated by growing in cultivated ground into simulating the much rarer *R. major*. The Continental plant is usually much more marked than the British specimens I have seen.—**R. stenophyllus* Schur. E. Melbury Hill, near Shaftesbury. F. Chalky turf, Knowlton.—*Melampyrum pratense* L. D. East Morden. F. Edmondsham; Westley Wood, near Bailey Gate.—Var. *latifolium* Schreb. and Mart. Witchampton; Edmondsham.

Orobanche major L. Edmondsham, where one plant only was seen.—*O. minor* L. Usually on clover, Edmondsham; Longfleet; but not infrequently on *Crepis virens*, as near Shapwick and Badbury. C. On *Crepis* on a wall, Osmington.—*O. amethystea* Thuill. was in great form at Seacombe, some five years ago; also seen on Dancing Ledge.

Pinguicula lusitanica L. Goatham.—*Verbena officinalis* L. Horton; Gussage All Saints; Nine Yews, Cranborne; between Hod and Hamildon Hills.

Calamintha Acinos Clairv. Very local in the county. C. Steepleton, near Dorchester, *L. V. Lester-Garland*. F. Edmondsham; Blagdon Farm, Cranborne. G. Seacombe. — *C. officinalis* Moench. Edmondsham.—*Salvia Verbenaca* L. Castle Hill; Gussage All Saints.—*Melittis Melissophyllum* L. has been brought me from Sutton Holms more than once.—*Marrubium vulgare* L. Newtown; Edmondsham; not native in either. G. Near Corfe Castle, native.—*G. angustifolia* Ehrh. Edmondsham; Cranborne Farm. G. Norden Farm.—*Lamium amplexicaule* L. Edmondsham; apparently very scarce in the district; Branksome Park. G. Swanage. By mistake *L. amplexicaule* × *purpureum* was said in the *Flora of Bournemouth* to grow three-quarters of a mile north of Bailey Gate. The hybrid intended was *L. hybridum* × *purpureum*.

(To be continued.)

SHORT NOTES.

Thymus spathulatus Opiz in Britain (p. 346).—The Rev. E. F. Linton in his interesting note speaks of two varieties of *Thymus* as not recorded for Britain previously. One of these, however (*T. præcox* Opiz var. *spathulatus*), is given in my *List of British Plants* (Jan. 1908); the arrangement of the genus in the *List* is due to the kindness of Dr. Domin, when he was staying with me in 1907. The following localities may be worth recording:—

T. glaber Mill. (*T. Chamædrys* Fr.). Westward Ho, N. Devon; near Andoversford, Gloster E.; Widdy Bank, Durham; Corriefron, Dumfries; Ben Lawers, Ben Heasgarnioh, Mid Perth; Ben Laoigh, Argyll; Strath Carron E. Ross; Ben Dearg, W. Ross; Ben Hope, Sutherland W.; Brandon, Kerry.

T. ovatus Mill. (*T. Chamædrys* auct.). Shepherds, Cornwall,

Uphill, Som. N.; Hook, N. Hants, *Miss C. E. Palmer*; Dover, Kent E.; Chailey, &c., Sussex E.; Wytham, Berks; Bullingdon, &c., Oxford; Hyde Heath, &c., Bucks; Dunstable, Beds; Cosgrove, Northants; Great Doward, Hereford; Port William, Wigton; Tummel, Mid Perth; Golspie, Sutherland E.; Derrynane, Kerry.

T. ovatus × *Serpyllum*. Duns, Berwick.

T. præcox Opiz. St. Margaret's, Kent; on chalk rubble brought from the Downs, Berks; Freshwater, Isle of Wight, *Miss C. E. Palmer*—Var. *ovatus* (Opiz). Abbotsbury, Dorset; Aviemore, Easterness, 1887; Elgin; Loch Luichart, E. Ross; Ben Hope, Sutherland W.; An Teallach, W. Ross; Tain, E. Ross; Cave Hill, Antrim, 1898.

T. præcox × *Serpyllum*. St. Margaret's, Kent.

Most of the above were named by Dr. Domin.

The flowers of *T. ovatus* and *T. Serpyllum* appear to be dimorphic, and this adds greatly to the difficulty in separating the forms. *T. præcox*, *T. ovatus*, and *T. Serpyllum* differ greatly in the pubescence; I do not know whether *T. lanuginosus* Schrank, which is put as a variety of *T. Chamædrys* in the *Lond. Cat.*, has been passed as correct by Dr. Domin.—G. Claridge Druce.

Spiranthes Romanzoffiana not in Devonshire.—In *The Country-side* for August 22, 1908, the following appeared among the "Nature Records":—"Spiranthes gemmipara, found in plenty in a locality (name suppressed) in East Devon.—(M. Page). [This plant has been properly identified. It has been supposed to occur only in Ireland.—Ed.]." Other references to this important find, due in part to my enquiries, appeared in the same Journal for September 12, p. 201, and December 5, p. 36. In response to further enquiries, Mrs. Page has been so kind as to send me fresh specimens which she states are the same as those collected last year. They belong to *Epipactis palustris*.—R. Lloyd Praeger.

Epilobium angustifolium L.—The sudden appearance of this plant in vast abundance in a locality in which until this year it has never been observed may be worth recording. About four years ago a small pine wood on one of the slopes of St. George's Down near Newport, Isle of Wight, was almost wholly destroyed by fire. To-day (8th September) I walked through acres of the *Epilobium* growing there now mostly in seed. A large proportion of the plants were quite six feet in height. This wood has been well known to me for fifty years, and no plants of this *Epilobium* had ever before been seen there. The plant is not a common one in the island, and the nearest habitat is about two miles from the wood. The soil is very dry, being plateau gravel above the greensand: the height above the sea about 350 ft.—Frederic Stratton.

Scrophularia umbrosa in Ireland.—The record of Isaac Carroll's Irish specimen in Herb. Mus. Brit., published by Pryor in this Journal for 1877, p. 238, seems to have been overlooked by the compilers of *Cybele Hibernica* and *Irish Topographical Botany*.

The locality, which Pryor does not give, is "near Limerick, Aug. 1848"; this considerably extends its range, which is "confined, as at present known, to a few miles of the course of the Liffey" (Cyb. Hibern. 234).—JAMES BRITTEN.

ORCHIS MILITARIS IN ESSEX.—It may be worth while to supplement the reference to "the only record of its occurrence in Essex," given (Journ. Bot. 1883, 230) from a specimen gathered by Dale in 1738, by the following from the herbarium of Joseph Andrews, who showed Dale the plant in that year, and had previously sent it to him in 1729, as a letter from Dale to Andrews shows. Andrews writes: "This pretty Orchis I found in a little field on the left hand of the Gate that opens on to Water [Walter] Belchamp Causey from Bulmer: the corner of the field comes up to the Gate—May 27, 1729." Later he adds on the same slip of paper: "The place where I found this Orchis is ploughed up and sowen with Oats this 9th of May 1746, so I fear it is lost."—JAMES BRITTEN.

HYPOCHÆRIS GLABRA IN LANCASHIRE (p. 355).—This plant has not hitherto been found in West Lancashire, although it may yet be found to occur there, as it is one of the species that would not be affected by the draining of the slacks, since it grows on the very driest of the sandhills. The Ainsdale locality mentioned by Mr. Melvill is in South Lancashire, where it was found by Mr. G. E. Hunt in 1869. This is recorded as Freshfield in Green's *Flora of Liverpool*, the locality lying between Freshfield and Ainsdale; the plant still occurs there in some abundance. It was found still earlier (1866) near Crosby by Lord de Tabley. These and other localities are given in Green's *Flora of Liverpool*, and the plant is well known to, and is frequently seen by, members of the Liverpool Botanical Society.—J. A. WHELDON.

WORCESTERSHIRE PLANTS.—I found two small patches and a few scattered plants of *Sedum anglicum* on the hill near Malvern Wells on June 27th last. So far I have not succeeded in finding it at any other spot in the neighbourhood. On August 27th I found several plants of *Juncus tenuis* at the base of the hill at Malvern. Both of these, like so many of our hill and common-land plants, are very much stunted. Specimens of *Sagina Reuteri* × *apetala* have been gathered by Mr. Spencer H. Bickham and myself at Malvern. *Juncus articulatus* × *sylvaticus* was collected by me at Interfields, Malvern Link, in the year 1886.—RICHARD F. TOWNDROW.

CAMPANULA TRACHELIUM × LATIFOLIA.—I gathered one plant of this hybrid in the parish of Cradley, Herefordshire, in July, 1908.—RICHARD F. TOWNDROW.

"FOLLOWERS OF MAN" (p. 270).—*Sola nobilitas virtus*, I reply to Mr. E. S. Marshall, with every desire to make the *amende honorable* for any unconscious brusqueness of style. I value his work far too highly not to set a just estimate on his opinion. I

wanted facts and was only thinking of them, and thanks to this Journal I have obtained them. I have never used the word "native," so we have been writing from two very different standpoints all along. I defined my position some time ago as follows:—

"*Areal* means adapted to the environmental conditions of any given limit, field, village, county, or kingdom, without any suggestion of the original place or conditions of evolution, or method of reaching the locality referred to. *Local areal* means the same, limited by some condition or requirement of soil, moisture, stocking, &c. *Extra areal* means the species cannot, without *conscious* help on the part of man, survive in a limited local environment."

By "conscious help" I imply that when the husbandman breaks up the ground, he knows beforehand certain monocarps will take possession of the freshly turned soil on account of its freedom from competition; and amongst others *Anagallis arvensis*. It must be left to Mr. and Mrs. Clement Reid, and I trust their many followers, to settle the question whether *A. arvensis* is "native, *i.e.*, aboriginal or introduced without the direct or indirect agency of man," to use Mr. G. C. Druce's explicit definition. The past history of plants in these islands is one study, their present position under modern conditions quite another. Purposely to exclude the past I invented the ugly terms *areal*, *local areal*, and *extra-areal*.

I wish to be perfectly candid. I see no reason why *A. arvensis* should not have reached these shores before man did, or by some other means than as his follower. I have absolute proof that it is (1) wind-, (2) water-, and (3) bird-carried to-day. The chances, I should say, are that it came by natural means, otherwise than as a follower of man. Mr. Reid told me some time ago by letter that few desert-prairie species have yet been discovered; but our vast stretches of quaternary rocks will no doubt finally supply them to earnest workers. This full acknowledgement leaves us exactly where we were, however, unless we ask ourselves how the case is under modern conditions of human occupation. Divide all plants into two lists: (1) followers of man, and (2) shunners of man. There can be no doubt in which list this species comes. In ninety-nine cases out of a hundred where it is found, Is it a follower of man, or is it native? by Mr. Druce's definition. I can only say I have never met with a case in these islands which to me suggested its "citizenship" in the native sense. As field workers we are surrounded by "human conditions" to our very mountain tops, thanks to our flocks and fed deer; is it not wiser then to leave the citizenship of our plants to the geo-botanists? It is only a question of time; they will settle the matter definitely some day; as field workers we can only fall back on the result of the aggregate of cases under modern conditions, on the percentage of accumulated experience. We always do so in ordinary cases; why not in this case?

For instance, Mr. Druce's reference to *Scleranthus annuus* is most valuable, and very much to the point as regards conclusions drawn from averages. The matter he refers to is one I have been

collecting notes about for years. Would not the general use of the term "monocarp" for annual or biennial simplify matters greatly? I want some facts. Do not all annuals become biennials if they cannot flower and produce seed in their first season? This is my experience generally and particularly. Is it not equally true that the further north you travel into the shorter arctic summer the more rapid the flowering and ripening season of our common annuals becomes? Human cultivation is now so old—as old in Europe as the Swiss lake dwelling of the middle period—that it has had time to modify species by acting as a form of environment. Everything must tell in the struggle for existence. Surely we have some proof! *Æthusa Cynapium* is an instance from all I have read. It has no "wild native habitat" or is not known except as a follower of man. Do not old-world weeds come out top in new lands, because they have long ago adapted themselves by evolution to the environment caused by man? Why should we not recognise this as a law? If in ninety per cent. of cases the plant is a "follower" where we know the circumstances, let us treat it as such where we cannot clearly follow its history, for this is what we always do in the case of "shunners," even when we find them "out of place" by theory.—E. Adrian Woodruffe-Peacock.

REVIEWS.

Flora of Cornwall: being an Account of the Flowering Plants and Ferns found in the County of Cornwall, including the Scilly Isles. By F. Hamilton Davey, F.L.S. With six Portraits and a Map. Penryn: Chegwiddin. 8vo, cl., pp. lxxxviii, 570. Price £1 1*s*.

In this, the most recent addition to our local floras, we have the result of ten years' steady work by a resident in the county who is not only personally acquainted with the region of which he writes, but who has taken every means, by correspondence and otherwise, to render his records as complete as possible. As our readers are aware, Mr. Davey had already, in 1902, issued a *Tentative List* of Cornish plants in which, as we said at the time of its publication, the enumeration was fuller than that of many county floras (Journ. Bot. 1902, 271); the present volume affords ample evidence that the succeeding years have greatly added to the completeness of the work.

The Flora proceeds on the usual lines. It begins with an introduction of eighty-eight pages, in which are passed in review the topography, climate, and geology of the county; about half the space is devoted to the history of botanical research in Cornwall, beginning with a record from Lobel in 1576. This history is very carefully done, the author having steered a middle course in his biographical notices between undue brevity and excessive prolixity; portraits are given of six of the principal workers at the Flora—C. A. Johns, James Cunnack, William Curnow, John

Ralfs, T. R. Archer Briggs and Richard Vercoe Tellam. After this comes a description of the eight districts—five of them founded on river-basins—into which the county is divided for botanical purposes, followed by a list of the books, MSS. and herbaria quoted; a summary of the differences between the Flora and that of the adjacent county, Devon, concludes the introduction, which is followed by the Flora proper, in which the ferns and fern allies and *Characeæ* are the only cryptogams included.

The distribution of the species is given in what might seem in some instances excessive detail, but this matter must always largely be guided by local circumstances. A notable feature is the number of local names, both English and Cornish, some of which have not, we think, previously been placed on record. The space occupied by plants whose claims to a place in the county are spurious or at best doubtful is, we think, somewhat excessive; to take an example from the second page, the entry of *Thalictrum Kochii* might have been altogether dispensed with by a slight extension of the note under *T. majus* where the important part of it is repeated. The "planted" record of *Frankenia lævis* and the naturalization of *Mesembryanthemum æquilaterale* hardly justify the space they occupy; and the account of the doubtful occurrence of *Trichomanes radicans* in the county certainly does not demand the two pages and more which are devoted to it. It is, however, we think more convenient to place all the plants in one series, as Mr. Davey, following most precedents, has done, than to place them in a separate list at the end, which necessitates two references where one would suffice. There should certainly have been more distinction between natives and casuals: thus on p. 125 *Trifolium resupinatum* and *T. agrarium*, although called "casual" and "very rare" appear in exactly the same type and manner as *T. procumbens* and *T. dubium*.

In books of this kind weight and space are items of importance to those who carry them about for reference, and these might have been considerably reduced without detriment to the work; the type, especially for the headings of the genera, and of the orders, is needlessly large, and the local printer, who has done his work well—there are singularly few misprints—would have done it still better had he been given a good example—say the *Flora of Oxfordshire*—to follow; in any case, the placing of the name of a plant on the last line of a page—see *Polygala vulgaris*, p. 61—and beginning the next without repeating it, might have been avoided.

We are glad to see that Mr. Davey, in addition to local names, cites local traditions where these exist, and quotes others from Borlase, the historian of the county. He has also made due use of the early writers on British botany, although occasionally his having to trust to others for this has led to an inaccuracy; thus the locality assigned to Merrett for *Matthiola sinuata* does not appear in that author's *Pinax*, whence it is cited. Under this, by the way, we are glad to see a warning note, repeated in other

cases, "to prevent future misunderstanding," as to the recent sowing of the plant on Mullion Cliffs; the succeeding species, *M. incana*, has been introduced at Newquay.

The frequent references to *Topographical Botany* render it desirable to remind local workers that Watson's documents from which this work was originally compiled are in the National Herbarium and readily available for consultation. A reference to these would have cleared up doubts in certain cases. Thus under *Lythrum Hyssopifolia* Mr. Davey says: "It is reported for East Cornwall in Top. Bot., but I am unable to trace Mr. Watson's authority"; a reference to his MSS. shows that Watson's only authority was the very unsatisfactory *Penzance Guide* which Mr. Davey quotes, and which Mr. Watson cites from Pascoe's equally unsatisfactory list in Bot. Gaz. ii. 38–40—a paper, by the way, which though cited in the Flora is not mentioned by Mr. Davey either under Pascoe or in his bibliography. Probably the *Lythrum* has no claim to insertion, and the same may almost certainly be said of the Top. Bot. record—the only one for the county—of *Lactuca muralis*, although G. S. Gibson, in whose Catalogue sent to Watson it appears (unlocalized), was an excellent botanist. Another plant which must entirely disappear is *Tillæa muscosa*; this stands "Corn. east?" in the Flora on the authority of Top. Bot., but there is no note of it as a Cornish plant in Watson's MSS. The quotation from the *Phytologist* (vi. 176) is inaccurate in so far as it states that there is a localized specimen of *Pyrus domestica* in Buddle's herbarium—Buddle's specimen is not localized; but we are indebted to Mr. Davey for telling us more than we knew about "Walter Moyle Esq. and Mr. Stephens," whose names occur from time to time in Ray's *Synopsis*. There is, we think, little doubt that the "kind of mercury with leaves like spinage," referred to by Borlase in a passage placed by Mr. Davey under *Mercurialis perennis*, is *Chenopodium Bonus-Henricus*, which in Lincolnshire is called "Marquery" and eaten as spinage.

In one little matter—a matter too often disregarded—Mr. Davey might have done better. When quoting from a book, it is quite easy to add to the reference the number of the page; it gives no trouble to the quoter to do this, for the volume is open before him, but it saves both time and labour to those who come after: Mr. Davey too often contents himself with giving the volume or the name of the book. On the whole, however, he has given us a highly satisfactory piece of work, and the fact that he has carried it to so successful an issue in spite of hindrances from ill-health and other causes is a matter for congratulation both to author and readers.

JAMES BRITTEN.

Agriculture in the Tropics: an Elementary Treatise. By J. C. WILLIS, Director of Royal Botanic Gardens, Peradenya, Ceylon. 8vo, pp. 222. Price 7s. 6d. net. Cambridge University Press.

To compress into a little over two hundred pages a treatise on tropical agriculture is a task which seems well-nigh impossible to

a great extent, but Dr. Willis has succeeded in doing this. As a work of reference for those who are working at agriculture problems in the Tropics, and as a textbook for those who, though living at home, are interested in the various industries described, Dr. Willis's book will be welcome.

The author's experience of agriculture has been gained in Ceylon, with short visits to surrounding countries, and the views he takes of agricultural questions are thus necessarily to a great extent through Sinhalese glasses. This in itself is not entirely a disadvantage, as a different point of view is often helpful to the study of questions of tropical agriculture, and Dr. Willis's suggestions will no doubt give new ideas to those working at scientific agriculture in other parts of the world.

The author repeats the opinion which he has expressed before, that "there are now practically no new products of the old kind which can be introduced into the country." The introduction recently of various new rubber-producing plants and the advances in organic chemistry both point to the fact that the useful plants of the vegetable kingdom are by no means all discovered or properly utilized. Men like Dr. Willis should by no means despair of enriching the world by winning from the jungle or the plain plants which can be profitably cultivated for food, textile substances, or other useful purpose.

The number of cultivated plants dealt with—more than a hundred and fifty—makes it difficult to give a general criticism of this part of the book. We would suggest that in a later edition the author should mention with each plant the conditions under which it can be grown, and some figures as to the profits which have been obtained in countries where the plant has been cultivated.

The larger part of the volume consists of a careful consideration of the methods and conditions of tropical agriculture under such headings as:—"Population and Labour"; "Drainage and Irrigation"; "Financing of Village Agriculture"; "Education of the Peasant"; "Organization of Agriculture." It is not the author's fault that these subjects cannot be adequately dealt with in the few pages given to each; though this is impossible, Dr. Willis gives views and suggestions which will afford useful ideas to those engaged in working out the varied problems of scientific agriculture in the Tropics.

Only three pages are devoted to a subject which is the most vitally important in tropical agriculture:—"The Diseases of Plants and their Treatment." It is probable that more good has been done to planting in the Tropics by science in the direction of preservation and cure of plant diseases than by all the useful work of ameliorating methods of cultivation and introducing new economic plants. The value of protective jungle belts as a hindrance to the spread of parasitic fungi and insects is hardly noticed by Dr. Willis. His book will be read by administrators who are controlling new lands where agriculture is in its infancy, and it is important for such men to realize that, before the land

has been opened up, provision should be made for these isolating barriers. The Malay States Government has recently permanently reserved belts of jungle two miles thick crossing the country at certain intervals and separating large areas of rubber, coco-nut, and other cultivations. This policy is recognized by all who have knowledge of the spread of plant diseases as one which should be adopted wherever it is possible.

Dr. Willis's book is an advance on Dr. Nicoll's *Tropical Agriculture*, previously the only book in English on the subject, and should do much to further the progress of scientific agriculture in the Tropics—a cause in which the author has worked diligently and with great success.

J. B. Carruthers.

Darwin and Modern Science: Essays in Commemoration of the Centenary of the Birth of Charles Darwin and of the Fiftieth Anniversary of the Publication of the 'Origin of Species.' Edited by A. C. Seward. Cambridge University Press. Price 18*s.* net.

The Foundation of the 'Origin of Species': Two Essays written in 1842 and 1844 by Charles Darwin. Edited by his son Francis Darwin. Cambridge University Press. 1909.

These two handsome volumes are a permanent memorial of the proceedings of this summer in Cambridge in connection with the Centenary of the birth of Charles Darwin, and it may be at once said that both of them, though for different reasons, are of the highest interest and value. To commence with the latter and smaller volume, we have in it the two trial essays out of which the *Origin of Species* was eventually evolved. The importance which its writer attached to the second sketch is shown by a letter to his wife which is printed in the preface, and contains minute directions as to how the sketch should be edited and printed should Darwin's death occur before it had been given to the public. With very characteristic modesty, the letter commences with the statement: "If, as I believe, my theory in time be accepted even by one competent judge, it will be a considerable step in science."

Those who have the time and desire to make a study of the successive stages by which Darwin arrived at his final conclusions will find a comparison of the three documents a very fascinating occupation, though it is obviously impossible to attempt any such analysis here. There is, however, one point which may be mentioned as an example of the evolution to which we have been alluding. Everyone remembers the celebrated passage at the end of the *Origin* which commences: "There is grandeur in this view of life." This passage, in practically identical terms, is also to be found at the termination of each of the two essays printed in this volume. In the second a portion of this passage reads: "having been originally breathed into matter under a few forms, *perhaps into only one*," and the words which we have italicised were, so it is stated in a note, added in pencil between the lines. In the

earlier draft it reads practically as in the final *Origin*. From this it would appear that Darwin was still uncertain as to whether a monophyletic or a polyphyletic form of evolution was the more likely hypothesis, and, it may be added, this uncertainty remains to the present day, for whilst undoubtedly the greater number of biologists hold the monophyletic thesis, there are others, and amongst them such prominent authorities as Oskar Hertwig, Boveri, and v. Wettstein, who think that "the theory of development from a variety of stocks," as Hertwig puts it, is the more probable.

The other volume of the two under review is in the nature of a "Festschrifft," and consists of a number of essays by various prominent persons on various aspects of the evolutionary hypothesis. If anyone doubts the truth of the statement that whatever else Darwin may have done he has at least given the most powerful stimulus of modern times to scientific work, he has only to glance through the pages of this book and he will doubt no more.

Where all the stars of heaven sing together it is a little difficult within the limits of any reasonable notice to give an adequate idea of the notes which each one utters.

But of one thing there is no doubt, and that is of the inclusiveness exercised in the choice of writers. For instance, we have Haeckel declaring that Darwin is the cause whereby "pure monism is securely established" (p. 151), whilst in another part of the same work the Rev. Mr. Waggett argues that Darwin's "work has led to improvements in the preaching of the Christian faith" (p. 493). And again we have Weismann urging (p. 25) that "individual variations" can have *selection-value*,* though as he admits a few lines lower down that in proof of this statement "even one who, like myself, has been for many years a convinced adherent of the theory of selection can only reply: *We must assume so, but we cannot prove it in any case*"—a somewhat unconvincing form of argument to the enquirer.

And, on the other hand, we have de Vries taking up a wholly different point of view and minimising the importance of Natural Selection, on which the first-named writer so much relies, by pointing out, what one would have supposed was mere common-sense observation, that Natural Selection cannot cause variations, but that "in order to be selected, a change must first have been produced" (p. 70).

In a somewhat similar strain speaks Professor Bateson when he says: "We must relegate Selection to its proper place. Selection permits the viable to continue, and decides that the non-viable shall perish. . . . Selection determines along which branch Evolution shall proceed, but it does not decide what novelties that branch shall bring forth" (p. 96). In a footnote, it may be added, Professor Bateson calls attention to a curious unfulfilled prophecy of Darwin, who stated (*Origin*, 6th ed. p. 425)

* The italics in these quotations are those of the authors.

that "Systematists will be able to pursue their labours as at present, but they will not be incessantly haunted by the shadowy doubt whether this or that form be a true species. . . . The endless disputes whether or not some fifty species of British brambles are good species will cease." Well most of us know, to our sorrow, that these disputes have not ceased, and that there is just as much doubt on the point in many cases as there was fifty years ago. Professor Bateson laments the "isolation of the systematists" as "the one most melancholy sequela of Darwinism," and adds, "Should there not be something disquieting in the fact that among the workers who come most into contact with specific differences are to be found the only men who have failed to be persuaded of the unreality of those differences?" (p. 89).

At any rate the outside observer, impassionately dealing with the purely biological portion of this volume, will have no difficulty in coming to the conclusion that whilst all the writers profess themselves evolutionists, and thereby join themselves to many an earlier writer than Darwin, scarce any two of them agree as to the actual causes and laws of evolution, these being as much in dispute as ever. In one direction alone does there seem to be real progress, and, what is more, genuine hope of real enlightenment, and that is in connection with the Mendelian laws, which curiously enough receive but little consideration in this volume. Professor Bateson seems to express gratification that Darwin never saw the essays of his contemporary (p. 96), since an acquaintance with the intricacies of the system of which he was the father might have prevented the author of the *Origin* from uttering that "bold pronouncement" which "the time called for" (p. 96). Others must often have speculated as to the effect which a perusal of the obscure journal in which Mendel published his discoveries would have had upon the mind and writings of the author of the *Origin of Species*.

Naturally in such a work as this the chapters relating to biological matters demand and must receive the larger share of notice, but, as has indeed already been hinted, there are other sections which do not relate to biological subjects in the strict sense of the word.

Thus, for example, we have Miss Harrison dealing with "The Study of Religions," after the approved and not always very convincing method of the folk-lorist. Professor Bury treats of "Darwinism and History"; Sir George Darwin discusses the relation of his father's theory to "The Genesis of Double Stars," and Mr. Whetham, in what is, in many repects, the most interesting and arresting article in the book, deals with the "Evolution of Matter." From this brief and incomplete conspectus it will be seen that almost the whole circle of the sciences is touched upon, not to speak of divagations into literature and religion; in fact, those who wish to see the most recent views of some of the most distinguished persons of the present day upon modern scientific problems of widely varying character will here find all that they require.

BERTRAM C. A. WINDLE.

BOOK-NOTES, NEWS, &c.

The output of botanical work in connection with the Belgian Congo continues with astonishing energy, under the editorship of Prof. E. de Wildeman. We have just received the first fascicle of the *Flore du Bas- et du Moyen-Congo*, which is to form vol. 3 of the botanical portion of the *Annales du Musée*. It is sumptuously, not to say extravagantly, printed in large quarto and illustrated by twenty-seven well-executed plates of the more interesting novelties, as well as by figures in the text. Among these are *Thonnera*, a new genus of *Anonaceæ*, an order which is increased by twelve new species, seven of which are figured. The phanerogams are throughout elaborated by Dr. de Wildeman, the fungi by Messrs. H. & P. Sydow, the ferns by Dr. Christ.

Messrs. Jacks' handsome work *Beautiful Flowers*, which we have more than once commended, has now completed its serial issue and may be obtained in two handsome quarto volumes at half a guinea each (net). The illustrations throughout have attained a high average of excellence; we should have welcomed more from the pencil of Miss Eleanor Fortescue-Brickdale, whose studies of individual flowers suggest a hope that some enterprising publisher—perhaps Messrs. Jack—will secure from her a volume of such studies. The letterpress of the volumes is practical, but the book will be chiefly valued for its excellent illustrations.

Messrs. Williams & Norgate have published a handsome volume of *Illustrations of Cyperaceæ* (price 12*s.* 6*d.*), prepared under the direction of the late Charles Baron Clarke. The volume consists of 144 useful plates, mostly containing details of more than one species, with explanatory text but no descriptions; these will in some instances be found in no. viii of the "Additional Series" of the Kew *Bulletin*, published in September 1908 under the title *New Genera and Species of Cyperaceæ*, of which no copy has reached us. The plates, however, consisting as they largely do, of dissections, come within the definition of publication laid down by the Vienna Rules; most of them are drawn by Mr. C. H. Fitch, a few by Miss Matilda Smith & Mr. N. E. Brown, and are reproduced, with the exception of a few lithographs, by the collotype process.

There is now on view at the Natural History Museum an exhibition of *Memorials of Charles Darwin*—"a collection of manuscripts portraits medals books and natural history specimens to commemorate the centenary of his birth and the fiftieth anniversary of the publication of *The Origin of Species*," to quote textually the somewhat breathless expansion of the title which appears on the wrapper of the "Special Guide" so entitled. The Guide—which costs sixpence, is edited by Dr. Harmer, the Keeper of Zoology, and is admirably printed—contains, besides a descriptive list of the objects exhibited, a brief biography, with a reproduction of Mrs. Cameron's photograph-portraits taken about 1868, and of Boehm's statue in the hall of the Museum.

On Whit-Monday, two or three years since, we heard a working-woman call the attention of her little girl to this statue in the following words: "Look, Polly! 'Ere's poor old Darwin! He's the man wot said we all come from monkeys!" Such is fame. Apart from its special usefulness in relation to the exhibition, the Guide contains much information of general interest, and it is we think to be regretted that it is only to be obtained at the Museum. This regret applies with greater force to such publications as the *Guide to the British Mycetozoa*, which is really a monograph—the only cheap one existing in English—and that to *Sowerby's Models of British Fungi*, a popular handbook of our larger species: it is much to be wished, in the interests of science and of the general public, that some arrangement could be made by which these and the numerous others connected with Zoology could be obtained in the ordinary way, through the bookselling trade.

The death is announced, at Le Rocher, Lamastre, Ardèche, on August 8, in his sixtieth year, of César François Marie Chantre, who during his residence in this country (1878–1882) was a Fellow of the Linnean Society, and took much interest in botany. He was an intimate friend of the late George Nicholson, with whom he was associated in the finding of *Utricularia neglecta* in Middlesex (see Journ. Bot. 1883, 85).

Robert Morton Middleton was born on Jan. 25th, 1846, at Sowerby, near Thirsk, Yorkshire, but at an early age removed with his parents to Northallerton, where his father became a bank manager. He was at first employed in his father's bank, but subsequently went to West Hartlepool, where he embarked in the shipping interest. Afterwards he went to the United States, whence he returned and settled in Ealing in 1896. From his boyhood he had been an ardent naturalist, and while at Ealing he took an active part in the work of the local Scientific Society. He then went to South America, where for more than two years he worked among the Araucanian Indians of South Chili as an agent of the Church Missionary Society. He returned to England about two years ago, bringing with him an interesting collection of plants, some of which he presented to the Department of Botany of the Natural History Museum, where he obtained temporary employment. He left for a holiday in July, expecting to return to his work, but while on a visit to his son-in-law at Wallington, Surrey, he was attacked with appendicitis, succumbing after an operation on August 8th, and was buried at Bandon Hill Cemetery near Croydon. Middleton had a good knowledge of British plants, of which he had at one time a large collection; this he presented to the MacGill University of Montreal. Of a genial and kindly disposition, he was always glad to be of use and to place his knowledge at the disposition of others. He published but little; his last paper, on "The First Fuegian Collection," preserved in the Sloane Herbarium, appeared in this Journal for June last. In 1880 Middleton became a Fellow of the Linnean Society, at whose meetings he often exhibited objects of interest.

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Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

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FURTHER GLAMORGANSHIRE RECORDS.

By H. J. Riddelsdell, M.A.

The following are additional to the records made in "A Flora of Glamorganshire," which was published as a Supplement to the *Journal of Botany*, 1907. They are arranged upon the same plan, except that the order and nomenclature of the *London Catalogue*, ed. 10, is now followed. Some herbaria kept at the School of Art, Gloucester, have been consulted, but most of the new localities given are the result of personal observation. My best thanks are again due to Messrs. Groves, Hackel, Ley, Linton, Marshall, Rogers, and to others, for generous help. Aliens are recorded separately at the end of the paper. Starred species are those not found in the above-mentioned Flora.

Clematis Vitalba L. 9. Machen, Coed-y-gores.

Anemone nemorosa L. 7. Llantrithyd, St. Nicholas, Porthkerry, Cwrtyrala; *fl. purpureo* in some quantity at Llantrithyd. 9. Frequent south of the hills.

Ranunculus circinatus Sibth. 8. St-y-Nyll.

R. trichophyllus Chaix. 8. Cardiff Docks.

R. heterophyllus Weber var. *submersus* (Hiern). 8. Cardiff Docks.

R. peltatus Schrank. 1. Moor at Reynoldstone. 6. Laleston, Southerndown, near Dunraven.

R. Baudotii Godr. f. 6. Merthyr Mawr.

R. hederaceus L. 7. St. Hilary. 9. Penylan, Rhyd-y-penau. —Var. *omiophyllus* (Ten.). 9. Rhyd-y-penau, Llanedan, Coed-y-gores.

R. sceleratus L. 8. Leckwith Moors.

R. auricomus L. 7. Porthkerry. 8. St. Fagan's, Caerau.

R. acris L. var. *Borœanus* (Jord.). 1. Parkmill. 8. Mountain Ash. 9. Draethen, Llwyn-y-grant, and frequent.—f. *tomophyllus* (Jord.). 8. Peterston, Canton.—Var. *rectus* (Jord.). 2. Panty-ffynon. 4. River gravel at Resolven. 5. Port Talbot. 8. Garth Wood and Llwydcoed.

R. bulbosus L. 4. Resolven. 6. Glyn Corwg, Sutton, Ewenny, Bridgend, Southerndown. 7. Llantrithyd. 9. Whitchurch.

R. parviflorus L. 6. Southerndown, Dunraven. 7. Porthkerry.

R. Ficaria L. 6. Bridgend, Laleston. 9. Frequent.—Var. *incumbens* F. Schultz. 8. Ely, Caerau.

Trollius europæus L. 9. Draethen, *Mrs. Griffith.*

Helleborus fœtidus L. 6. Dunraven, ? planted.

Aquilegia vulgaris L. 5. Margam, *Gough's Camden.* 8. Radyr.

Aconitum Napellus L. 8. R. Ely from Fairwater to St. Fagan's, in quantity. 9. Draethen, wood near Whitchurch, Llanedan and Rumney river and tributary streams, very frequent and in great masses. Also on Monmouthshire bank. Undoubtedly native.

Fumaria Borœi Jord. 1. Oxwich Bay.

F. Bastardi Bor. 2. Gowerton.

Radicula Nasturtium-aquaticum Rendle & Britten var. *siifolia* Druce. 8. Meadows at Ely.

R. sylvestris Druce. 5. Port Talbot. 8. Garth Wood, Radyr and neighbourhood, frequent.

R. palustris Moench. St-y-Nyll, Ely, Radyr, Llandaff, Leck-with Moors, &c.

Barbarea vulgaris Ait. var. *decipiens* Druce. 8. Near Aberdare.

Arabis hirsuta Scop. 7. Woods, Cwrtyrala.

Cardamine flexuosa With. 6. Glyn Corwg. 7. Cwrtyrala, Llantrithyd, Porthkerry. 8. Llandaff to Radyr and St. Fagan's, frequent. 9. Frequent south of the hills.—Var. *umbrosa* Gren. & Godr. 4. Perddyn Woods.

Erophila verna E. Meyer. 7. Llantrithyd, Llantwit Major.—Var. *stenocarpa* (Jord.). 8. Morlais Castle and Pontsarn.— Var. *leptophylla* (Jord.).? 1. Llanmadoc, Penard, Broughton Burrows. 6. Sutton.

E. præcox DC. 1. Llanmadoc. 7. Porthkerry.

E. virescens Jord. 7. Llantwit Major, Cold Knap.

Cochlearia officinalis L. 6. Southerndown, Dunraven.

C. danica L. 6. Sutton, Dunraven, St. Bride's Major.

C. anglica L. 9. Penylan.

Sisymbrium Thalianum Gay. 8. Llandaff, Llancaiach.

S. officinale Scop. var. *leiocarpum* DC. 7. Old lane near Cadoxton. 8. Canton.

Brassica oleracea L. 6. Dunraven. 7. Nash Point.

B. nigra Koch. 6. Dunraven.

B. arvensis O. Kuntze. 5. Port Talbot.

Capsella Bursa-pastoris Medic. 1. Sands, Port Eynon, native. 6. Sutton, native.

Coronopus didymus Sm. 8. Llandaff, Ely, Canton, Penarth.

C. procumbens Gilib. 6. Southerndown. 7. Barry. 8. Leck-with Bridge.

Lepidium campestre Br. 6. Dunraven. 8. Cardiff.

L. heterophyllum Benth. var. *canescens* Gren. & Godr. 8. Llan-caiach.

Reseda lutea L. 8. Canton.

Helianthemum canum Baumg. 1. Caswell Bay to Mumbles.

H. Chamæcistus Mill. 6. Southerndown, Dunraven, St. Bride's Major, Broughton. 8. Caerau.

Viola palustris L. 6. Glyn Corwg. 8. Llancaiach, Radyr 9. Draethen, hills opposite Machen, wood near Whitchurch.

V. odorata L. 7. St. Lythan's, St. Nicholas, Llantrithyd, Bon-vilstone. 8. Llandaff neighbourhood, very common ; Bonvilstone. 9. Coed-y-gores, wood near Whitchurch.—f. *alba*. 7. St. Nicholas, Cwrtyrala. 9. Coed-y-gores.

V. hirta L. 6. Sands, Merthyr Mawr. 7. Coast, Llantwit Major ; Cwrtyrala, Cwm George, Llantrithyd. 8. Caerau.

V. sylvestris Kit. 7. Barry, St. Lythan's, St. Nicholas, Cwrtyrala. 8. Fairwater, Caerau, St. Fagan's. 9. Llwyn-y-grant, Llanishen.

V. Riviniana Reichb. var. *nemorosa* Neum. Wahlst. & Murb. 8. Caerau. 9. Coed-y-gores.

V. canina L. 6. Dunraven.

V. arvensis Murr. var. *ruralis* (Corb.). 2. Gowerton. 7. Porthkerry. — Var. *arvatica* (Jord.). 6. Porthcawl. 8. Radyr. — Var. *agrestis* (Jord.). 1. Oxwich.—Var. *Timbali* (Jord.). 8. Llandaff.

V. Curtisii Forster var. *Pesneaui* Lloyd & Fouc. 6. Candleston.

Polygala vulgaris L. 4. Rhigos. Large fl. f. on Craig-y-llyn.

P. oxyptera Reichb. 6. Sutton, Southerndown.

Silene latifolia Rendle & Britten var. *puberula* (Jord.). 9. Draethen.

**S. noctiflora* L. 7. St. Hilary, *Vachell sp.*! Doubtfully native.

Lychnis alba Mill. 9. Penylan.— × *dioica*. 8. Cardiff.

L. Flos-cuculi L. *fl. albo*. 3. Killay.

Cerastrium tetrandrum Curt. 1. Caswell Bay to Mumbles. 6. Sutton. 7. Porthkerry.

C. semidecandrum L. 6. Sutton.

C. viscosum L. var. *apetalum* (Dum.). 7. Porthkerry.

Stellaria aquatica Scop. 8. Fairwater; in quantity at Peterston. 9. Coed-y-gores and below, by side of R. Rhymney.

S. apetala Ucria. 6. Sutton.

S. neglecta Weihe var. *decipiens* E. S. M. 8. Fairwater. 9. Coed-y-gores, wood near Whitchurch.

S. uliginosa Murr. 6. Glyn Corwg.

Arenaria trinervia L. 6 and 7. Frequent.

A. serpyllifolia L. var. *viscidula* Roth. 6. Southerndown.

A. leptoclados Guss. 6. Dunraven, Broughton. 7. Nash Point.

Sagina maritima Don. 6. Southerndown.

S. apetala Ard. 1. Llanmorlais, Llanmadoc. 2. Loughor Marshes. 8. Llwydcoed, Penarth.

S. ciliata Fr. 6. Southerndown.

Spergula arvensis L. 8. Llandaff.

Spergularia salina Presl. 9. Pengam Marshes. The type.

Montia fontana L. a. *minor* All. 6. Glyn Corwg. 8. Llancaiach, St. Fagan's, Radyr. 9. Frequent south of the hills.

Hypericum perforatum L. var. *angustifolium* DC. 9. Draethen.

H. maculatum Crantz. 6. Southerndown. 8. Fairwater, Llancaiach.

H. pulchrum L. 6. Glyn Corwg.

H. elodes L. 8. Llancaiach.

Malva moschata L. 5. Baglan. 6. Dunraven, Broughton. 8. Llandaff to Llantrissant and neighbourhood, frequent.—Var. *intermedia* Gren. & Godr. 5. Port Talbot.

M. sylvestris L. 6. Looking native on steep sloping cliff at Southerndown.

M. rotundifolia L. 8. Canton.

Geranium sanguineum L. *fl. albo*. 1. Port Eynon.

G. pratense L. 7. Barry.

G. pyrenaicum Burm. fil. 5. Baglan.

G. pusillum L. 8. Canton.

G. columbinum L. 1. Reynoldstone. 5. Aberafan. 6. Sutton. 8. Llantrissant to Radyr. 9. Near Caerphilly.

G. lucidum L. 6. Corntown. 7. Cwm George.

Erodium cicutarium L'Hérit. 6. Sutton.

E. maritimum L'Hérit. 6. Sutton, Dunraven, Southerndown, &c.

Euonymus europæus L. 7. Cwrtyrala, Porthkerry. 8. Caerau, and woods between Ely and St. Fagan's. 9. Draethen.

Rhamnus Frangula L. 8. Radyr. 9. Llwyn-y-grant, wood near Whitchurch, wood near Machen.

Genista anglica L. 8. Whitchurch. 9. Machen.

G. tinctoria L. 6. Laleston. 9. Llwyn-y-grant.

Ulex minor Roth. 1. Worms Head, *Hb. Motley*; "probably *U. Gallii* Planch. var. *humilis* Planch.," *Ar. Bennett in litt.*

Cytisus scoparius Link. 7. Tumbledown Hill.

Ononis repens L. 6. Southerndown. Var. *horrida* Lange. 6. Sutton.

O. spinosa L. 7. Bonvilstone. 8. Leckwith, Cogan.

**O. reclinata* L. 1. Port Eynon, *Hb. Jos. Woods*!

Trigonella ornithopodioides DC. 6. Cliff at Southerndown.

Medicago lupulina L. var. *scabra* Gray. 8. Canton.

M. arabica Huds. 8. Canton.

Melilotus altissima Thuill. 8. Radyr, Penarth to Lavernock.

M. officinalis Lam. 8. Canton.

Trifolium arvense L. 8. Canton.

T. striatum L. 6. Southerndown.

T. scabrum L. 3. Swansea, Aug. 16th, 1851, *Hb. Glos. Mus.*

T. fragiferum L. 9. Pengam Marshes.

T. filiforme L. 1. Moor near Reynoldstone. 6. Dunraven.

Anthyllis Vulneraria L. 8. Quaker's Yard.

Lotus corniculatus L. var. *villosus* Ser. 6. Southerndown.

Astragalus glycyphyllos L. 7. Sully, one patch.

Ornithopus perpusillus L. 5. Hills behind Port Talbot.

Hippocrepis comosa L. 6. Ogmore Down, *A. H. Trow in litt.*

Onobrychis viciæfolia Scop. 6 and 7. Roadsides about Cowbridge. 7. Cwmcidy, Llantrithyd, Sully.

Vicia hirsuta Gray. 8. Canton. 9. Whitchurch.

V. Cracca L. var. *argentea* Coss. & Germ. 8. Canton.

V. sepium L. 6. Laleston. 9. Frequent.

V. angustifolia L. 9. Lisvane, Whitchurch.

Prunus spinosa L. var. *macrocarpa* Wallr. 8. Wood between Ely and St. Fagan's.

P. insititia L. 8. Ely. 9. Coed-y-gores, wood near Whitchurch.

P. Cerasus L. 8. Radyr.

P. Padus L. 8. Radyr.

Spiræa Ulmaria L. var. *denudata* Boenn. 8. St-y-Nyll.

Rubus idæus L. 8. Radyr, Fairwater, St. Fagan's. 9. Machen, Whitchurch.—f. *asperrimus*. 8. Fairwater.

R. fissus Lindl. 8. Radyr, very rare.

R. Rogersii Linton. 8. Wood at Pontyclun.

R. plicatus Weihe & Nees. 9. Wood near Whitchurch.

R. affinis × *rusticanus*. 8. Probably this at Peterston.

R. cariensis Génév. 5. Valley behind Port Talbot. 8. Radyr, rare; Pontyclun, Pendoylan to Welsh St. Donat's. 9. Whitchurch and near Machen.

R. Lindleianus Lees. 7. Bonvilstone. 8. Radyr. 9. Whitchurch, Lisvane, Machen.

R. argenteus Weihe & Nees. 5. Port Talbot. 7. Bonvilstone. 8. Frequent between Llandaff, Llantrissant, and Welsh St. Donat's. 9. Lisvane, Whitchurch, Machen.

R. rhammifolius Weihe & Nees. 8. Radyr, very rare; Peterston, St-y-Nyll, Ely. 9. Whitchurch.

R. nemoralis P. J. Muell. var. *silurum* Ley. 8. Llantrissant. 9. Whitchurch.

R. pulcherrimus Neum. 8. Peterston. 9. Whitchurch.

R. Selmeri Lindeb. 8. Wood at Pontyclun. 9. Whitchurch.

R. Godroni Lec. & Lam. 5. Valley behind Port Talbot. 8. Radyr, Pontyclun, St-y-Nyll. 9. Whitchurch, Llanishen, Rudry. —Var. *robustus* (P. J. Muell.). 8. St-y-Nyll, Radyr.

R. rusticanus Merc. 7. Bonvilstone. 8. Very common in the Llandaff neighbourhood. 9. Common south of the hills.

R. macrophyllus Wh. & N. 8. Radyr, Ystradowen. 9. Whitchurch.—Var. *amplificatus* (Lees). 8. Pontyclun.

R. Salteri Bab. 8. Radyr, Peterston, wood at Pontyclun.

R. hypoleucus Lefv. & Muell. 8. Very common in the Llandaff neighbourhood. 9. Whitchurch.— × *leucostachys*. 8. Apparently this at Radyr.

R. hirtifolius Muell. & Wirtg. var. *mollissimus* (Rogers). 8. Pontyclun, and a plant going off from this towards *R. leucostachys* at Radyr.

R. pyramidalis Kalt. 8. Radyr, Lantrissant.

R. leucostachys Sm. 8. Llandaff neighbourhood, Llantrissant, St-y-Nyll. 9. Machen, Llanishen. — Var. *leucanthemus* P. J. Muell ? 8. Ely.

R. leucostachys × *pyramidalis*. 8. Radyr.—*R. leucostachys* × *robustus*. 8. Radyr.

R. lasioclados Focke var. *angustifolius* Rogers. 8. Pontyclun, St-y-Nyll, Radyr. 9. Rudry.

**R. criniger* Linton. 9. Llanishen.

**R. mucronatoides* Ley f.. 8. Pontyclun.

R. anglosaxonicus Gelert. var. *curvidens* Ley. 8. Pontyclun. —Var. *vestitiformis* Rogers. 8. Radyr.—Var. *setulosus* Rogers. 8. St-y-Nyll. 9. Rudry.

R. Borreri Bell-Salt. 8. Peterston.

R. Drejeri G. Jensen var. *Leyanus* Rogers. 8. Radyr, Pontyclun. 9. Machen.

R. echinatus Lindl. f. 8. Radyr.

R. oigoclados Muell. & Lefv. f. 8. Radyr.—Var. *Bloxamianus* (Colem.) f. 9. Hill opposite Machen.

R. melanodermis Focke. 8. Radyr. 9. Whitchurch.

R. ericetorum Lefv. 8. Radyr.—Var. *cuneatus* Rogers & Ley. 8. Llandaff, Radyr, Peterston.

R. mutabilis Génév. 8. Radyr. 9. Caerphilly.

R. fuscus Weihe & Nees var. *nutans* Rogers. 8. Pontyclun, a form going off to *R. leptopetalus*.

R. pallidus Weihe & Nees. 8. Radyr, St. Fagan's. 9. Rudry, Whitchurch. Forms varying somewhat from type.

R. scaber Weihe & Nees. 8. Pontyclun, Radyr. 9. Lisvane, Whitchurch, Llanishen.

**R. rosaceus* Weihe & Nees. 9. Caerphilly.—Var. *infecundus* Rogers. 5. Hills and valley behind Port Talbot. 8. Radyr..

**R. Koehleri* Weihe & Nees. 8. Radyr.—Var. *cognatus* (N.E.Br.). 8. Pontyclun.

R. Marshalli Focke & Rogers var. *semiglaber* Rogers. 5. Behind Port Talbot.

R. dumetorum Weihe & Nees. 8. f. near *ferox* at Radyr.—Var. **britannicus* (Rogers). 4. Pontneddvechan *Ley*. 7. Bonvilstone. —Var. *diversifolius* (Lindl.). 8. Pontyclun, St. Fagan's.—Var. *raduliformis* Ley. 9. Whitchurch, *forma*.

R. corylifolius Sm. 1. Uplands, Mumbles, 1847, *Hb. Sessions*. 8. St-y-Nyll. 9. Whitchurch. — Var. *cyclophyllus* (Lindeb.). 7. Bonvilstone.

R. cæsius L. 7. Bonvilstone. 8. Llandaff neighbourhood, common. 9. Near Machen, Whitchurch.

Geum urbanum L. 6. Sutton.

G. rivale L. 8. Peterston.

Fragaria vesca L. 6. Glyn Corwg.

Potentilla erecta Hampe. 6. Glyn Corwg. 7. Cwrtyrala, — × *procumbens*. 2. Gowerton. 8. Cefn Penar. 9. Llanishen, Cefn On, Caerphilly, Whitchurch.

P. procumbens × *reptans*. 9. Llanishen.

Alchemilla arvensis Scop. 6. Southerndown, St. Bride's Major, Dunraven, &c.

A. vulgaris L. a. *pratensis* Pohl. 6. St. Bride's Major. 8. Wood near Ely, St. Fagan's. 9. Caerphilly—b. *alpestris* Pohl. 4. Pontwhalby. c. *filicaulis* (Buser). 7. Cowbridge, Cwmcidy, Llantrithyd. 8. Llwydcoed, Peterston, St. Fagan's.

Agrimonia Eupatoria L. 8. Llandaff neighbourhood, frequent; Llantrissant. 9. Draethen.

Rosa spinosissima L. 1. Uplands, Mumbles, 1847, *Hb. Sessions*, Bishopston Glen, 1847, *Hb. Glos. Mus.*

**R. omissa* Déségl. var. *submollis* (Ley). 8. Llwydcoed to Hirwaun, Aberdare.

**R. Andrzeiovii* Steven. 2. Pantyffynon.

R. tomentosa Sm. 8. Llwydcoed, Llancaiach.

**R. cuspidatoides* Crépin. 9. Apparently this between Taffs Well and Caerphilly.

R. Eglanteria Huds. 5. Margam Great Wood, *Hb. Motley*!

R. micrantha Sm. 8. Caerau. Storrie's records for "*R. sepium*" were by some error placed under *R. micrantha* in my 'Flora.'

R. obtusifolia Desv., acutely toothed f. 2. Loughor. 8. About Aberdare.—Var. *decipiens* (Dum.). 2. Pantyffynon, Loughor.

R. canina L. a. *lutetiana* (Léman.). 9. Pengam Marshes.—

g. *dumalis* (Bechst.). 7. Swanbridge. 8. Llwydcoed, Llancaiach. —l. *andegavensis* (Bast.). 1. Bishopstone. 7. Porthkerry.

R. dumetorum Thuill. var. *urbica* (Léman.). 4. Glyn Neath. 8. Llwydcoed to Hirwaun.

R. glauca Vill. 1. Oxwich. 8. St-y-Nyll, Llwydcoed.

R. stylosa Desv. var. *systyla* (Bast.). 6. Sutton. 8. St-y-Nyll.

Pyrus communis L. 7. St. Nicholas.

P. Malus L. a. *sylvestris* L. 6. Sutton. 7. Cwrtyrala, Llantrithyd. 8. Wood near Ely, Llancaiach. 9. Whitchurch.

Saxifraga tridactylites L. 6 & 7. Cowbridge to Ewenny. 7. Cwm George, Porthkerry.

S. granulata L. 8. Wood above Ely by the river. 9. Coedy-y-gores.

Chrysosplenium oppositifolium L. 6. Glyn Corwg, Merthyr Mawr. 7. Cwrtyrala. 9. Common south of the hills.

C. alternifolium L. 8. Wood above Ely by the river.

Ribes rubrum L. 6. Copse at Merthyr Mawr. 8. St. Fagan's. 9. Whitchurch, Llanishen, Coed-y-gores. At 8, in the wood between Ely and St. Fagan's occurs a form halfway between type and var. *petræum* (Sm.).

R. nigrum L. 8. Wood at Radyr. 9. Draethen, Whitchurch.

Sedum Telephium L. 9. Lisvane.

Drosera rotundifolia L. 8. Llancaiach.

Hippuris vulgaris L. 8. St-y-Nyll.

Myriophyllum spicatum L. 6. Broughton, Merthyr Mawr.

M. alterniflorum DC. 1. Moor by Reynoldstone.

**Callitriche palustris* L. Mr. Arthur Bennett tells me that he has a specimen from this county.

C. stagnalis Scop. 8. Llancaiach. 9. Llwyn y grant, Llanedan, Whitchurch, Coed-y-gores, near Machen, &c.

C. intermedia Hoffm. 8. Llancaiach. 9. Rhydypenau.

C. obtusangula Le Gall. 8. Radyr.

Peplis Portula L. 8. Llancaiach.

Epilobium tetragonum Curt. 8. Cardiff. — × *obscurum*. 8. Canton.

E. palustre L. 6. Sutton. 8. Llancaiach, Peterston.

Eryngium maritimum L. 1. Mumbles, 1847, *Hb. Glos. Mus.*

Conium maculatum L. 6. Dunraven. 8. Leckwith, Canton, Fairwater. 9. Llanishen.

Smyrnium Olusatrum L. 7. Cogan, Barry. 9. Whitchurch.

**Bupleurum tenuissimum* L. 9. Pengam Marshes.

Apium graveolens L. 6. Dunraven.

A. inundatum Reichb. fil. 1. Moor, Reynoldstone. 8. St-y-Nyll.

Sison Amomum L. 6. St. Bride's Major, Cowbridge to Ewenny. 8. Leckwith, Grangetown Moors.

Sium erectum Huds. 5. Port Talbot. 7. Cwrtyrala. 8. Riverside above Ely, Fairwater.

Ægopodium Podagraria L. 8. Fairwater. 9. Probably native on banks of River Rhymney for a long distance below Coed-y-gores.

Pimpinella Saxifraga L. 8. Llandaff neighbourhood, frequent. 9. Pengam Marshes, Llanedan, Coed-y-gores.

Conopodium majus Loret. 6. Glyn Corwg.

Fœniculum vulgare Mill. 1. Sea-coast, Mumbles, 1847, *Hb. Sessions.*

Crithmum maritimum L. 1. Rocks, Mumbles, 1847, *Hb. Sessions.*

Œnanthe fistulosa L. 8. St-y-Nyll.

Æthusa Cynapium L. 8. Llandaff neighbourhood, common.

Silaus flavescens Bernh. 8. St-y-Nyll, Leckwith, St. Fagan's. 9. Pengam Marshes.

Peucedanum sativum Benth. & Hook. 7. Sully, native.

Daucus Carota L. 8. Llandaff neighbourhood. 9. Penylan.

D. gummifer All. 7. Nash Point.

Caucalis nodosa Scop. 1. Mumbles to Caswell Bay. 6. Dunraven, &c. 7. Marcross, on the cliffs.

Adoxa Moschatellina L. 6. Merthyr Mawr. 7. St. Nicholas, Cwrtyrala. 8. St. Fagan's, Caerau, Radyr, plenty. 9. Frequent south of the hills.

Galium Cruciata Scop. 6. Southerndown, Broughton. 6 and 7. Cardiff to Cowbridge and Ewenny, common. 9. Coed-y-gores.

G. saxatile L. 1. Caswell Bay.

G. palustre L. var. *elongatum* (Presl.). 8. Near Ely, by the river.

G. Aparine L. 9. Frequent.

Asperula odorata L. 7. Cwrtyrala. 8. Ely.

A. cynanchica L. 6. Southerndown.

Sherardia arvensis L. 6. Southerndown. 7. Cliffs, Monknash.—Var. *hirsuta* Baguet. 2. Ystalyfera.

Valeriana dioica L. 8. Fairwater, Ely, St. Fagan's, St-y-Nyll. 9. Whitchurch.

V. sambucifolia Mikan. 6. Glyn Corwg.

Valerianella olitoria Poll. 6. Sutton. 7. Cowbridge.

Dipsacus sylvestris Huds. 6. Dunraven.

Eupatorium cannabinum L. *fl. albo.* 8. Roadside between Welsh St. Donat's and Peterston.

Solidago Virgaurea L. 6. Glyn Corwg. 9. Coed-y-gores, Machen.

Aster Tripolium L. 5. Port Talbot, with f. *discoidea.*

Erigeron acre L. 7. Swanbridge.

Filago germanica L. 6. Southerndown.

Gnaphalium uliginosum L. 8. Pentyrch, Caerau, Radyr. 9. Machen.

Inula squarrosa Bernh. 8. Radyr, Fairwater.

Bidens tripartita L. 8. Canton, St-y-Nyll.

Anthemis Cotula L. 8. Canton, Peterston.

Matricaria inodora L. var. *salina* Bab. 1. Port Eynon.

Artemisia vulgaris L. var. *coarctata* Fors. 8. Llandaff, Ely, Radyr, Canton.

Petasites ovatus Hill. 8. Common about Llandaff.

Senecio sylvaticus L. 5. Port Talbot. 8. St. Fagan's.

S. viscosus L. 8. Llandaff.

S. erucifolius L. 6. Dunraven, Broughton, St. Bride's Major, Southerndown. 8. Cardiff. 9. Pengam Marshes.

Arctium majus Bernh. 7. Cwrtyrala. 8. Fairwater, St-y-Nyll.

A. Newbouldii Ar. Benn. 4. Pontwhalby. 7. Nash Point. 8. Pontyclun, St-y-Nyll.

A. minus Bernh. 7. Marcross, Nash Point. 8. Peterston, Fairwater, Pontyclun.

Carduus pycnocephalus L. var. *tenuiflorus* (Curt.). 8. Cardiff.

C. nutans L. 8. Radyr, &c.

C. crispus L. 8. Ely.—Var. *acanthoides* (L.). 8. Canton, St-y-Nyll.

Cnicus eriophorus Roth. 8. Leckwith and near Fairwater.

C. tuberosus Roth. 8. Cardiff Docks: not *C. Woodwardii*, but apparently the same form as at Nash Point.

C. pratensis Willd. 3. Killay. 6. Glyn Corwg. 7. Cwrtyrala, Llantrithyd. 8. Llantrissant, Radyr, wood near Pentyrch. 9. Wood near Whitchurch.

C. acaulis Willd. 7. Near Lavernock Station.

C. arvensis Hoffm. var. *mitis* Koch and var. *setosus* (Bess.). 8. Canton.

Serratula tinctoria L. 7. Cliffs at Nash Point. 9. Rhydypenau, Whitchurch, Machen.

Centaurea nigra var. *decipiens* (Thuill.). 7. Near Lavernock Station. Delete the other stations.

C. Scabiosa L. *fl. albo.* 7. Nash Point. 8. Radyr.

Cichorium Intybus L. 8. Canton, Radyr, fields at Pentyrch.

Picris hieracioides L. 8. Radyr, Fairwater, Llandaff to Peterston.

P. echioides L. 6. Dunraven.

Crepis biennis L. 6. Broughton. 8. Hirwaun.

Hieracium Pilosella L. var. *concinnatum* F. J. H. 9. Lisvane.

H. Schmidtii Tausch var. *eustomon* Linton. 8. Padell-y-Bwlch.

H. serratifrons Almq. var. *crassiceps* Dahlst. 8. Taffs Well. 9. Lisvane.—Var. *lepistoides* Johanss. 8. Radyr. 9. Lisvane.—Var. *cinderella* Ley. 9. Coed-y-gores.

**H. vulgatum* Fr., type. 8. Roadside, Radyr, very rare. The first record, I believe, for South Wales.

H. septentrionale Arv.-Touv. 5. Hills behind Port Talbot.

H. cacuminatum Dahlst. 8. Llwdycoed, Raydr, Taffs Well, above Caerphilly towards Pontypridd. — Var. *barbareæfolium* Dahlst. Probably this at 4. Neath. 8. Aberdare, Radyr.

H. tridentatum Fr. var. *setigerum* Ley. 3. Hedgebank, Glais, 9th Aug. 1905, *A. Ley* in *Wats. B. E. C. Report*, 1906–7.

H. sabaudum L. var. *boreale* (Fr.). 8. Llandaff, Ely, Radyr, Pendoylan to Welsh St. Donat's. 5. Under group *obliquum* (Jord.). Port Talbot.

H. umbellatum L. 8. Peterston (approaching var. *coronopifolium*). 9. Machen.

Leontodon autumnale L. 8. Fairwater, Llandaff, &c., very common, Llancaiach. 9. Pengam Marshes.

Taraxacum palustre DC. var. *udum* (Jord.). 6. Ewenny Down. 7. Llantrithyd, Barry. 8. Mountain Ash, Leckwith Hill.

Lactuca muralis Gaertn. 7. Cwm George, Llantrithyd, and Tumbledown Hill.

Sonchus oleraceus L. 4. Glyn Neath. 7. Nash Point. 8. Llandaff neighbourhood, frequent.

S. asper Hill. 8. Llandaff and neighbourhood, frequent.

Jasione montana L. 1. Sandhills, Port Eynon.

Wahlenbergia hederacea Reichb. 9. Hills near Machen.

Campanula rotundifolia L. 9. Llwyn-y-grant.

Vaccinium Myrtillus L. 8. Radyr.

Limonium binervosum C. E. Salmon. 6. Southerndown, Dunraven.

Lysimachia vulgaris L. 8. Llantrissant, Peterston, Llancaiach. 9. Machen.

L. Nummularia L. 7. Porthkerry. 8. River Ely below St. Fagan's.

Samolus Valerandi L. 6. Dunraven. 7. Bonvilstone. 8. Fairwater, wood at Pontyclun.

Blackstonia perfoliata Huds. 6. Dunraven. 7. Swanbridge, Sully, &c.

Centaurium pulchellum Druce. 9. Hill opposite Machen.

Menyanthes trifoliata L. 5. Baglan, *Miss Llewellyn.*

Symphytum officinale L. 6. Dunraven, St. Bride's Major. 7. Bonvilstone.

Anchusa sempervirens L. 7. Llantwit Major, Bonvilstone.

Lycopsis arvensis L. 1. Langland Bay, 1847, *Hb. Sessions.* 6. Sutton.

Myosotis scorpioides L. 7. Cwrtyrala. 8. Fairwater. — Var. *strigulosa* (Reichb.). 5. Port Talbot.

M. collina Hoffm. 7. Porthkerry.

M. versicolor Sm. 8. Caerau.

Lithospermum purpureo-cœruleum L. 6. Dunraven.

L. officinale L. 1. Oystermouth, *Hb. Sessions.* 7. Bonvilstone. 9. Draethen.

Calystegia Soldanella Br. 3. Swansea, 1847, *Hb. Sessions.* 6. Sutton.

Solanum nigrum L. 7. Cadoxton, Sully, Swanbridge. 8. Canton. 7 and 8. Llandaff to Cowbridge.

Hyoscyamus niger L. 6. Southerndown. 8. Canton.

Linaria Elatine Mill. 1. Mumbles, 1847, *Hb. Sessions.* 8. Wood at Pontyclun, near Llandaff and road to Radyr.

Scrophularia nodosa L. var. *bracteata* Druce. 8. Cardiff.

Veronica hederæfolia L. 8. St. Fagan's, wood at Caerau. 9. Llanishen.

V. didyma Ten. 8. Ely.

V. agrestis L. 1. Port Eynon.

V. serpyllifolia L. 4. Neddfechan Glen. 6. Ewenny Down. 7. Bonvilstone, Cwrtyrala, Porthkerry. 8. Radyr, St-y-Nyll, Caerau.

V. montana L. 7. Porthkerry. 8. Radyr, Caerau, Ely. 9. Very frequent south of the hills.

V. scutellata L. 9. Machen.—Var. *hirsuta* Weber. 1. Reynoldstone Moor.

V. Anagallis-aquatica L. 6. Broughton. 8. St-y-Nyll, Leckwith.

Euphrasia Rostkoviana Hayne. 2. Mynydd Carngoch; by R. Loughor above Pontardulais. 3. Killay.

E. brevipila Burn. & Grem. 1. Nicholaston; and f. *subeglandulosa*. 5. Marshes, Port Talbot.

E. stricta Host. 8. Hirwaun.

E. nemorosa H. Mart. 2. Gowerton. 8. Hirwaun, Radyr, Llantrissant, Peterston to Welsh St. Donat's.

E. curta Wettst. var. *glabrescens* Wettst. 1. Llanmadoc, Oxwich to Port Eynon. 4. Craig-y-llyn. 6. Dunraven, Sutton. 8. Canton, Hirwaun, frequent.

Bartsia Odontites Huds. var. *serotina* (Dum.). 8. Llantrissant, St-y-Nyll.

Pedicularis palustris L. 3. Killay, and *fl. albo*. 8. Llancaiach.

Melampyrum pratense L. 8. Radyr, type.

Pinguicula vulgaris L. 6. Glyn Corwg.

Verbena officinalis L. 9. Coed-y-gores, Machen.

Mentha rotundifolia Huds. var. *Bauhini* Ten. 1. Parkmill. 8. Whitchurch.

M. longifolia Huds. 8. Near Llandaff.

M. aquatica L. 7. Cwrtyrala. 8. St. Fagan's. — × *arvensis* (= *M. sativa* L.). 5. Port Talbot. 8. Near Pentyrch. — Var. *rivalis* Wats. (of *M. sativa* L.). 7. Talygarn. — Var. *paludosa* (Sole). 8. St. Fagan's.

M. rubra Sm. 8. Peterston.

M. arvensis L. 1. Parkmill. 8. Fairwater, Llantrissant.

Lycopus europæus L. 8. Llancaiach; Llandaff district, much; St-y-Nyll. 9. Machen, Whitchurch, Llwyn-y-grant.

Origanum vulgare L. 7. Bonvilstone, Sully, Swanbridge, Nash Point. 8. Frequent from Llandaff to Llantrissant.

Thymus Chamædrys Fr. 7. Bonvilstone.

Clinopodium vulgare L. 8. Llandaff, &c., to Llantrissant, common.

Calamintha montana Lam. 6. Sutton. 7. Nash Point, Cwrtyrala.

Nepeta Cataria L. 8. Canton.

N. hederacea Trev. var. *parviflora* Benth. 8. Leckwith Hill.

Scutellaria minor Huds. 9. Machen.

Marrubium vulgare L. 1. Mumbles, 1847, *Hb. Sessions*. 8. Canton.

Stachys palustris × *sylvatica* (= *ambigua* Sm.). 1. Mumbles, 1847, *Hb. Sessions*.

Galeopsis Tetrahit L. 8. Canton. 9. Llwyn-y-grant.—Var. *bifida* (Boenn.). 5. Port Talbot. 8. Radyr, St. Fagan's. 9. Machen.

Lamium purpureum L. var. *decipiens* Sonder. 8. Llandaff.

L. Galeobdolon Crantz. 7. Cwrtyrala, Cowbridge.

Ajuga reptans L. *fl. albo*. 9. Draethen.

Plantago lanceolata L. var. *Timbali* Reichb. fil. 5. Port Talbot.

P. Coronopus L. var. *pygmæa* Lange. 6. Sutton, Dunraven.

Chenopodium album L. 8. Ely. — Var. *paganum* (Reichb.). 8. Near Pentyrch.

C. Bonus-Henricus L. 8. Llandaff neighbourhood.

Atriplex patula L. var. *erecta* (Huds.). 8. Llandaff. — Var. *angustifolia* (Sm.). 8. Llandaff, St. Fagan's, Peterston. 9. Machen.

A. hastata L. 8. Fairwater.

A. deltoidea Bab. 7. Swanbridge. 8. Ely, &c.

Salicornia stricta Dum. 5. Kenfig, *Druce*.

Polygonum Convolvulus L. 8. Llandaff neighbourhood.—Var. *subalatum* V. Hall. 8. Canton.

P. aviculare L. var. *arenastrum* (Bor.). 8. Canton.

P. Persicaria L. var. *elatum* Gren. & Godr. 8. Fairwater.

P. lapathifolium L. 8. Cardiff.

P. Bistorta L. 6. Glyn Corwg. 8. Whitchurch to Tongwynlais.

Rumex maritimus L. 5. Port Talbot. 8. Canton.

R. pulcher L. 8. Cardiff.

R. Hydrolapathum Huds. 8. River Ely from Peterston downwards.

**Daphne Mezereum* L. 9. Draethen, *Mrs. Griffith*.

D. Laureola L. 6. Dunraven.

Euphorbia amygdaloides L. 7. Cwrtyrala, Wenvoe. 9. Coed-y-gores, Rhydypenau.

E. exigua L. 1. Cliffs at Port Eynon. 6. Cliffs at Southerndown, and among furze on steep cliffs at Monknash. Undoubtedly native in these three spots.

Humulus Lupulus L. 6. Sutton, Merthyr Mawr. 7. Bonvilstone. 8. Llantrissant, Llandaff and neighbourhood.

Betula tomentosa Reith. & Abel. 8. Llancaiach.

Salix triandra L. var. *Hoffmaniana* (Sm.). 9. Coed-y-gores.

S. alba L. 8. St-y-Nyll.

S. purpurea L. 8. Fairwater.

S. aurita L. 7. Llantrithyd.— × *caprea*. 9. Whitchurch.— × *cinerea*. 9. Whitchurch.

S. cinerea × *viminalis*. 8. Fairwater.

Taxus baccata L. 7. St. Lythan's, Barry. 8. Caerau, Ely. 9. Coed-y-gores, Whitchurch, Coed Coesau Whips.

Neottia Nidus-avis Rich. 7. Porthkerry.

Spiranthes spiralis Koch. 7. Swanbridge.

Helleborine latifolia Druce. 7. Cwrtyrala. 8. Pontyclun.

Orchis pyramidalis L. 6. Dunraven.

O. morio L. 6. Sutton, Laleston. 7. Cwmcidy, Llantrithyd, Porthkerry. 9. Llanishen.

O. mascula L. 6. Laleston. 7. Cwrtyrala, Cwmcidy, Llantrithyd. 8. Caerau, Ely, Leckwith Hill, Peterston *sp.*! 9. Whitchurch.

O. maculata L. 3. Killay.

O. ericetorum Linton. 1. Moor at Reynoldstone. 8. Llancaiach.

Narcissus Pseudo-Narcissus L. 8. Caerau.

Galanthus nivalis L. 8. Radyr. 9. Draethen, *Mrs. Griffith.*

Polygonatum multiflorum All. 9. Draethen.

Allium vineale L. var. *compactum* (Thuill.). 7. Nash Point.

A. ursinum L. 4. Resolven. 7. Cwrtyrala. 8. Cowbridge Road, River Ely below St. Fagan's. 9. Whitchurch, Llanedan, &c., Llanishen, Coed-y-gores.

**Colchicum autumnale* L. 6. Native at Laleston.

Paris quadrifolia L. 7. Llantrithyd. 8. St. Fagan's.

Juncus bufonius L. var. *fasciculatus* (Bert.). 8. Grangetown Moors.

J. squarrosus L. 6. Glyn Corwg.

J. conglomeratus L. 9. Frequent.

J. alpinus Vill. Mr. Bennett assigns the Porthcawl plant to subsp. *atricapillus* Day; and the Cardiff plant to the type.

Luzula pilosa Willd. 7. Cwrtyrala. 8. Caerau, Ely. 9. Coed-y-gores, Rhydypenau.

L. sylvatica Gaud. 6. Glyn Corwg. 9. Coed-y-gores.

L. campestris DC. 9. Frequent.

Typha latifolia L. 8. St-y-Nyll.

Sparganium erectum L. var. *microcarpum* (Neum.). 7. Flemingstone Moor; and a probable hybrid between this and *S. neglectum* Beeby at 7. Llantwit Major.

S. neglectum Beeby. 7. Llantwit Major, Cwrtyrala. 8. St-y-Nyll, Fairwater, Llandaff to Radyr.

S. simplex Huds. 8. Fairwater.

Arum maculatum L. 9. Frequent.

Lemna trisulca L. 8. St-y-Nyll.

L. minor L. 9. Rhydypenau.

Alisma ranunculoides L. 8. St-y-Nyll.

Triglochin palustre L. 8. St-y-Nyll, Fairwater.

Potamogeton natans L. 8. St-y-Nyll, Llancaiach.

P. crispus L. 1. Moor at Reynoldstone. 8. Fairwater.

Scirpus cæspitosus L. 6. Glyn Corwg.

S. fluitans L. 1. Moor at Reynoldstone.

S. lacustris L. 8. St-y-Nyll.

S. sylvaticus L. 3. Killay. 8. Fairwater, and St. Fagan's. 9. Wood near Whitchurch.

**S. rufus* Schrad. Mr. A. Bennett has a specimen from v.-c. 41.

Carex pulicaris L. 8. Whitchurch, Llancaiach.

C. disticha Huds. 8. Fairwater, and in marsh by River Ely below St. Fagan's.

C. paniculata L. 9. Wood near Whitchurch. — f. *simplicior* And. 4. Tennant's Canal.

C. contigua Hoppe. 9. Penylan.

C. divulsa Stokes. 8. St-y-Nyll, Llandaff, Pendoylan.

C. echinata Murr. 6. Glyn Corwg. 7. Llantrithyd. 8. Llandaff.

**C. remota* × *vulpina* (= *C. axillaris* Good.). Mr. Bennett has a Glamorgan specimen.

C. curta Good. 8. Llancaiach.
C. gracilis Curt. 8. Marsh between Ely and St. Fagan's.—Var. *gracilescens* (Almq.). 6. Ewenny.
C. pilulifera L. 6. Glyn Corwg. 8. Llancaiach.
C. caryophyllea Latourr. 6. Sutton. 7. Llantrithyd, Cwmcidy, &c. 8. Ely, St. Fagan's, Llandaff.
C. pallescens L. 8. Radyr.
C. panicea L. 7. Cwmcidy.
C. pendula Huds. 7. Cwrtyrala, Wenvoe.
C. strigosa Huds. 7. Cwrtyrala. Not recorded for sixty years in v.-c. 41.
C. sylvatica Huds. 1. Parkmill. 7. Porthkerry, Cwrtyrala. 8. Ely, St. Fagan's, Caerau. 9. Frequent.
C. fulva Host. 8. Whitchurch. 9. Lisvane.—× *Œderi* var. *œdocarpa*. 8. Whitchurch.
C. flava L. 8. Fairwater.—Var. *lepidocarpa* (Tausch.). 7. Bonvilstone.
C. Œderi Retz. var. *elatior* And. 8. Whitchurch.—Var. *œdocarpa* And. 8. Whitchurch.—Var. *cyperoides* Marss. 1. Oxwich.
C. Pseudo-Cyperus L. 8. St-y-Nyll. Not recorded for v.-c. 41 since 1773.
C. acutiformis Ehrh. 6. Ewenny. 7. Bonvilstone. 8. St-y-Nyll, Fairwater, marsh between Ely and St. Fagan's.—× *riparia*. 8. Fairwater.
C. riparia Curt. 9. Llanishen, Llwyn-y-grant.
C. inflata Huds. var. *robusta* E. S. M. 8. Llancaiach.—*C. inflata* × *vesicaria* (= *involuta* Bab.). 8. Llancaiach.
C. vesicaria L. 8. Llancaiach, St-y-Nyll, marsh below St. Fagan's.
Alopecurus myosuroides Huds. 8. Llandaff.
A. bulbosus Gouan. 8. Leckwith Moors.
A. pratensis L. 5. Pyle. 6. Ewenny. 8. Llandaff neighbourhood. 9. Whitchurch.
Milium effusum L. 7. Cwrtyrala. 8. Ely, Caerau. 9. Coed-y-gores, Llwyn-y-grant.
Phleum pratense L. var. *stoloniferum* Bab. 1. Port Eynon.
P. arenarium L. 6. Sutton.
Agrostis canina L. 5. Hills at Port Talbot. 8. Llancaiach.
A. alba L. var. *prorepens* Koch. 1. Oxwich Bay.
A. tenuis Sibth. 9. Coed-y-gores, Coed Coesau Whips, Whitchurch.
**Gastridium lendigerum* Gaud. 7. Nash Point, native.
Aira præcox L. 6. Southerndown.
Avena pubescens Huds. 6. St. Bride's Major.
Cynosurus cristatus L. var. *ovatus* Aschers. & Graebn. 6. Southerndown.
Koeleria gracilis Pers. 1. Whitford Burrows. 6. Dunraven, Southerndown, St. Bride's Major.
Poa nemoralis L. 9. River-bank, Coed-y-gores.
P. pratensis L. var. *angustifolia* (L.). 8. Cardiff Docks.
P. trivialis L. var. *glabra* Doell. 1. Whitford Burrows.

Glyceria fluitans Br. var. *triticea* Fr. 1. Reynoldstone. — × *plicata* (= *pedicellata* Towns.). 8. Caerau, Fairwater.
G. plicata Fr. 8. Caerau, Fairwater. 9. Whitchurch.
G. aquatica Wahlb. 8. Radyr, Llancaiach.
G. maritima Mert. & Koch. 6. Merthyr Mawr.
Festuca membranacea Druce. 6. Sutton, Southerndown.
F. ovina L. 5. Port Talbot.
F. rubra L. var. *arenaria* Fr. 5. Port Talbot.
F. elatior L. var. *arundinacea* (Schreb.). 1. Port Eynon.
Bromus giganteus L. 7, 8, 9. Frequent.
B. ramosus Huds. 8. Llandaff to Llantrissant.
B. erectus Huds. 6. St. Bride's Major.
**B. racemosus* L. 8. Caerau.
Agropyron repens Beauv. var. *barbatum* Duval-Jouve. 8. Llandaff.
A. junceum Beauv. 6. Southerndown.
Ceterach officinarum Willd. 9. Coed-y-gores.
Polystichum angulare Presl. 8. Caerau, Pendoylan to Welsh St. Donat's. 9. Coed-y-gores.
Lastrea spinulosa Presl. var. *decipiens* Syme. 8. Radyr.
L. aristata Rendle & Britten. 9. Coed-y-gores.—Var. *tanacetifolia* Moore. 8. Radyr.
Polypodium vulgare L. var. *serratum* Willd. 7. Cwm George. —Var. *cambricum* Willd. Still in Ray's locality.
Phegopteris polypodioides Fée. 6. Glyn Corwg.
Ophioglossum vulgatum L. 7. Cwmcidy.
Equisetum arvense L. var. *nemorosum* Braun. 8. Fairwater, Radyr.
Chara vulgaris L. 6. Sands, Sutton.
Nitella opaca Agardh. 1. Reynoldstone.

Aliens.

Only those (1) of some special interest, or (2) additional to the list at the end of "A Flora of Glamorganshire," are given :—

Eranthis hyemalis Salisb. 8. Caerau.
Berberis vulgaris L. 8. St. Fagan's.
Papaver Rhœas L. 6. Cliffs at Southerndown. Here it occurs in a dwarf form, and in situations which look more "native" than any I have seen elsewhere.
Corydalis lutea DC. 8. Llandaff.
Hesperis matronalis L. 6. In quantity in a copse at Merthyr Mawr, and *looking* native.
Lepidium latifolium L. 8. Canton, introduced.
Saponaria officinalis L. 7. Porthkerry, Bonvilstone. 9. Coed-y-gores. 8. Leckwith Hill, Canton, *fl. pleno.*
Hypericum calycinum L. 6. Dunraven.
Trifolium hybridum L. var. *elegans* (Savi). 1. Port Eynon.
Lathyrus latifolius L. 1. Caswell Bay, 1840, *coll. M. Moggridge*, and by him labelled *L. sylvestris*; *Hb. Watson.*
Prunus domestica L. 8. Wood between Radyr and St. Fagan's.
Sedum hybridum L. 7. Bonvilstone.

Sambucus Ebulus L. 8. Cardiff Docks. 9. Machen.

Kentranthus ruber DC. 5. Walls of Margam Abbey, *Gough's Camden's Britannia.* 6. Undercliff, Dunraven, naturalized; white and red.

Inula Helenium L. 7. Dinas Powys. 8. Leckwith. 9. Draethen, *Mrs. Griffith.*

Matricaria Chamomilla L. 1. Penrice. 8. Canton, Fairwater, Pentyrch.

M. suaveolens Buchen. 7. St. Hilary. 8. Very common. 9. Caerphilly.

Onopordon Acanthium L. var. *viride* Michx. 8. Canton.

Crepis taraxacifolia Thuill. 1. Parkmill. 7. Llantrithyd. 9. Whitchurch.

Symphytum peregrinum Ledeb. 6. Merthyr Mawr, Dunraven.

Anchusa officinalis L. 5. Port Talbot.

A. italica Retz. 8. Cardiff.

Pulmonaria officinalis L. 7. Cwrtyrala (not 8. Coedriglan).

Mimulus Langsdorffii Donn. 8. River Ely at Peterston.

Leonurus Cardiaca L. 9. Near Machen, *Mrs. Griffith.*

Chenopodium polyspermum L. var. *cymosum* Moq. 8. Cardiff.

Populus balsamifera L. var. *candicans* Ait. 8. Near Leckwith.

Phalaris minor Retz. 8. Cardiff Docks.

And the following:—*Glaucium corniculatum* Curt., *Argemone mexicana* L. var. *ochroleuca* (Sweet), *Lepidium perfoliatum* L., *Reseda stricta* Pers., *Lavatera sylvestris* Brot., *Ambrosia artemisiæfolia* L., and apparently *Senecio nebrodensis* L.

A NEW *CHRYSOPHYLLUM* FROM UGANDA.

By Spencer le M. Moore, B.Sc., F.L.S.

Chrysophyllum (§ Gambeya) **Kayei,** sp. nov. Ramulis validis superne paucifoliatis ut novelli subtilissime griseolo-furfuraceo-tomentellis; foliis anguste obovato-oblongis apice cuspidulatis ipso obtusis basin versus sensim angustatis margine leviter revolutis supra glabris nitidulis subtus subtilissime griseolo-tomentellis costis secundariis utrinque 8–10, pag. sup. planis levissimeve impressis, pag. inf. optime prominentibus percursis coriaceo-pergamaceis, petiolis supra anguste sulcatis subteretibus quam lamina circiter 8-plo brevioribus; florum fasciculis ex nodis foliatis vel jam nudis oriundis longius pedicellatis, calycis segmentis suborbicularibus extus ut pedicelli minutissime tomentellis coriaceis 2 interioribus membranaceis necnon sericeis, corollæ calycem breviter excedentis lobis oblongo-ovatis obtusissimis tubum semiæquantibus, filamentorum basi corollæ tubo adnatorum parte libera antheræ circa æquilonga, ovario oblongo-ovoideo dense sericeo-villosulo in stylum se ipso breviorem exeunte.—*C. albidum* Dawe Uganda Rep. p. 49, non G. Don.

Hab. Uganda, Mabira Forest; *E. Brown*, 473, in Herb. Mus. Brit. [Also at Kew from Toro, Kibale Forest; *Dawe*, 508.]

Arbor grandis. Internodia ± 2 cm. long. Folia 13–21 cm. long., 5–9·5 cm. lat.; costæ sec. ascendenti-patentes juxta marginem arcuatæ; reticulum satis densum, pag. sup. facile aspectabile, pag. inf. difficile etiam sub lente; petioli 1·5–2·5 cm. long. Pedicelli 6 mm. long., crassiusculi. Alabastra (sicca) 3 mm. diam. Calycis segmenta circa 4 × 4 mm. Corolla tota 4·5 mm. long.; hujus lobi circa 1·5 mm. long., margine sericei. Filamenta (pars libera) et antheræ fere 2 mm. long. Stylus crassus, 1·5 mm. long.

Nearly allied to *C. albidum* G. Don from West Africa, but easily distinguished, *inter alia*, by the larger flowers on longer pedicels, the broad calyx-segments, and the broader corolla-lobes only half as long as the tube. The native name is "Mululu Mukasi."

'FIRST RECORDS OF BRITISH FLOWERING PLANTS.'

By W. A. Clarke, F.L.S.

It will be known to those interested in the subject that the list of extracts under the above title which appeared in this Journal during 1892–6 was afterwards (in 1900) published separately in a revised edition in which the errors then known were corrected and many deficiencies were supplied. The work, however, is one in which anything like completeness and freedom from error is not easily attained, and the time seems to have arrived when a short list of further corrections, including several earlier records, may well be published. For many of these corrections I am indebted to friends, amongst whom I would especially mention the Editor of this Journal and Mr. Druce. Mr. F. H. Davey, whose excellent *Flora of Cornwall* has just appeared, also kindly called my attention to some early Cornish records which I had overlooked.

In recent years many alterations have been made in nomenclature, but I have made no attempt to bring the list up to date in that respect.

Ranunculus tripartitus DC. The plant of E. B. Suppl. 2946 was, it appears, *R. intermedius* Knaf (*R. lutarius* Bouvet); but true *tripartitus* was afterwards found near Cork, and by Mr. R. V. Tellam on "Innes Moor, Roche, E. Cornwall," Bot. Loc. Rec. Club Rep. for 1876. See also Journ. Bot. 1877, 209, and 1878, 38.

Add R. lutarius Bouvet in Bull. Soc. Scient. Angers 96 (1874). *1848.* "R. innominatus" of L. Cat. ed. 2. "Near Claremont House, Surrey," E. B. Suppl. 2946 (as *R. tripartitus* DC.).

Add Fumaria occidentalis Pugsley in Journ. Bot. 1904, 218. *1904.* Found by Mr. H. W. Pugsley at Penzance and elsewhere in Cornwall in 1902. Journ. Bot. *l. c.*

F. Vaillantii Loisel. Substitute "Chatham Hill, Kent." J. S. Henslow in Loudon's Mag. Nat. Hist. 1832, p. 88. (See Fl. Kent, p. 24.)

Cerastium alpinum L. The record from Ray's *Fasciculus* most probably refers to the next species, *C. arcticum* Lange, as suggested by Mr. Beeby. Both species occur in Scotland, so it is difficult to say what is the first certain record for restricted *alpinum*: perhaps Lightfoot's *C. latifolium*—Lightf. Fl. Scot. i. 242 (1777)—the figure opposite p. 199 being apparently this species.

Stellaria media Vill. For "*1735*" read "*1538.*"

Sagina apetala L. The reference should be "Ard. Animadv. Bot. ii. 22 (1763)."

Hypericum elodes L. The reference should be "L. Amœn. Acad. iv. 105 (1759)."

Ornithopus ebracteatus Brot. This record appears first in 1838 in a letter from Rev. H. Penneck to Dr. Barham, Nov. 5th, 1838, printed in the Report for that year of the Royal Institution of Cornwall.

Alchemilla vulgaris L. For "*1848*" read "*1548*," and add reference, "Turn. Names H. j."

Agrimonia odorata Mill. Substitute "Joseph Woods in Trans. of the Penzance Nat. Hist. and Antiq. Soc. for 1852. See Fl. Cornwall, p. 170."

Poterium officinale A. Gray. Delete reference to Bot. Gaz., and insert instead "But see Fl. Middx. p. 90, where Turner's 'Bipennella . . . about Sion' is referred to this species (Great Burnet)."

Saxifraga Hirculus L. This was found at Knutsford at least as early as 1720. Sherard, writing to Richardson on March 28th, 1721, says:—"I had a letter lately from Dr. Fowlkes, who . . . says *Saxifraga angustifolia fl. luteis punctatis*, Breyn, Cent., was found near Knutsbridge [*sic*] Mills in Cheshire." *Richardson Corresp.* 168. This was Robert Foulkes, of Llanbedr, Denbighshire: see *op. cit.* 132.

S. Geum L. Substitute "On the mountains of Keri [Kerry] *Sanicula guttata* grows in abundance." Lhwyd in Phil. Trans. xxvii. 526 (1712). Lhwyd's visit to Ireland was in 1699.

For "Myriophyllum alternifolium" read M. alterniflorum.

Omit Callitriche pedunculata DC.—the extract quoted refers to *C. truncata* Guss.—and add—

"C. truncata Guss. Pl. Rar. 4 (1826). Amberley, Sussex, Borrer, E. B. S. 2606 (as *autumnalis*). *1829.* See Journ. Bot. 1870, 155."

C. platycarpa Kütz. Add first record by this name, but the *Alsine palustris minor serpyllifolia* referred to in Ger. em. 615 (1633), as found "betweene Clapham heath and Touting, and betweene Kentish towne and Hampstead" was probably this, and more certainly Petiver's "*Stellaria pusilla pal. repens tetra-*

spermos," of which there is a specimen in his English Herbarium at Brit. Mus. (H. S. 151, f. 36), having on its printed ticket, "The first discovery of this Plant to be a Native of England we owe to the ingenious Physician and Botanist Dr. Hans Sloane who observed it in a Bog on Putney Heath, June 4, 1691."

C. AUTUMNALIS L. The Clunie Loch plant is mentioned in Sm. E. Fl. i. 10 (1824), and this species seems to be there described.

This leaves *C. hamulata* Kütz. with its var. *pedunculata* unaccounted for. Perhaps the earliest certain record is the *C. autumnalis* of Huds. Fl. Angl. 2 (1762), to which it is referred in Fl. Berks.

EPILOBIUM LAMYI F. Schultz. Insert "xxvii." after "Flora." It is doubtful whether Mr. Moore's plant was *E. Lamyi*. The first certain record seems to be Mr. Towndrow's "Near Malvern" in Journ. Bot. 1885, p. 349.

MONESES GRANDIFLORA S. F. Gray. For "James Hog" read "James Hoy."

SCROPHULARIA SCORODONIA L. The reference should be to "Phil. Trans. 1712, p. 527," where this record first appears.

MENTHA GENTILIS L. If the "M. arvensis verticillata folio rotundiore odore aromatico" of Ray (Syn. ed. 2, 123) be correctly referred to this species (see Babington, Fl. Camb. 175) the first record dates from that work—1696—"found by Mr. Wigmores at Shelford in Cambridgshire."

MENTHA ARVENSIS L. Substitute "Corne mint," Turner Names Bviii, *1548*; "Growth much in England among the corne, and it is called in English commonly Corne mint." Turn. Herb. i, 101, *1568*. Mr. Britten now considers that Turner's references belong to this plant, and not as he had previously thought, to *Calamintha arvensis* Lam.

SALVIA PRATENSIS L. This record appears first in Plukenet's *Almagestum*, 185 (1696).

Add STACHYS ALPINA L. Sp. Pl. 581 (1753). Found in June, 1897, by Mr. Cedric Bucknall near Wootton-under-Edge, Gloucestershire. Journ. Bot. 1897, p. 380.

SALICORNIA RADICANS. Add—This is the "Perennial Kali" found near Sheppy, referred to by Sloane in letter to Ray dated Aug. 10, 1686 (Ray, Corr. 186).

POLYGONUM DUMETORUM L. Add "But this species was found by Mr. Luxford on 22 Sep. 1826, near Reigate, Surrey. Note on drawing for E. B. Suppl. Plate in Bot. Dept. Brit. Mus."

P. MINUS Huds. Substitute "Persicaria minor seu pusilla procumbens nobis . . . in Angliæ pratis." Morison's Hist. Ox. ii. 589 (1680).

EUPHORBIA PORTLANDICA L. Substitute "Tithymalus maritimus minor Portlandicus. . . . The Reverend Mr. William Stonestreet . . . first discovered this about a year since on a narrow Neck of Land covered with Peebles (*sic*) which joyns Portland

with the Coast of Dorsetshire." Petiver in Phil. Trans. xxix. 282 (1715).

E. LATHYRIS L. (*Lathyrus*). Banks found one plant of this on the Steep Holmes in June, 1773; see Journ. Bot. 1905, p. 300. This specimen is in the British Herbarium Herb. Mus. Brit. with the following note in Banks's hand: "I found this one plant among the *Ligustrum* on the south side of the Steep Holmes island, but being hurried by the tide had not time to search for more."

CYPRIPEDIUM CALCEOLUS L. The date should be *1629*, as the same record occurs in Parkinson's *Paradisus*, p. 348.

ALLIUM TRIQUETRUM L. Substitute "Found by Mr. James Cunnack in a plantation at Antron," near Helston, and at an earlier period at "Nansloe, near the Loe pool," Cornwall. Journ. Bot. 1872, p. 245 and 1873, p. 206.

For "LUZULA FOSTERI" read L. FORSTERI, and for "JUNCUS FOSTERI" read JUNCUS FORSTERI. Also for "1790" read "1795."

L. MAXIMA DC. Substitute "*1640.* Gramen nemorum hirsutum majus . . . about Highgate and other places. Park. Th. 1184–6. *Cf.* Lob. Illustr. 39 (1655)."

ERIOCAULON SEPTANGULARE With. The reference should be "With. Bot. Arr. ii. 784 *bis* (1776)," which is important, showing that Withering's name is earlier than *Nasmythia articulata* of Hudson (1778). It has hitherto been generally quoted from the third edition of Withering (1796).

ELEOCHARIS ACICULARIS R. Br. For "Ray Syn. 202 (1790)" read "Ray Hist. 1306 (1688)."

SCIRPUS PAUCIFLORUS Lightf. Add "Mr. Druce (Journ. Bot. 1909, 108) shows that the plant referred to in Ray Syn. 210 (1690) as 'Graminifolia plantula Alpina capitulis Armeriæ proliferæ: in pascuis ad radicem excelsæ cujusdam rupis y Clogwyn du ymhen y Glyder in agro Arvoniensi, D. Lloyd,' was probably this."

S. FLUITANS L. Add "Mr. Britten has shown (Journ. Bot. 1909, 103) that C. Bauhin was the first to mention *S. fluitans* as an English plant, it being the plant sent to him by Arnold Gillen, and referred to in his *Prodromus* (1620), p. 23."

CAREX PARADOXA Willd. Add "Found by Dr. Spruce in Heslington fields [York] in April, 1841. Phytol. i. 842."

C. FULVA Good. Add "But it is doubtful what Goodenough's plant really was. See note by R. A. Pryor in Journ. Bot. 1876, p. 366."

FESTUCA RIGIDA Kunth. Substitute "*1640.* Gramen panicula multiplici. Medow hard grasse with manifold tufts. . . . In Fieldes and Medowes," Park. Th. 1157, 5—this is more satisfactory than Gerard's "Gramen minus duriusculum."

NOTES ON THE FLORA OF DORSET.

By the Rev. E. F. Linton, M.A.

(Concluded from p. 384.)

Littorella uniflora Aschers. In a large shallow depression of the west side of the Salisbury line a little way north of West Moors station; and in a similar hollow on the other side of the line at Three Cross; both hollows become pools in wet weather.

Chenopodium polyspermum L. Edmondsham, garden weed.—*C. murale* L. Sturminster Marshall.—*Atriplex littoralis* L. Lilliput.—Var. *marina* L. D. Mr. Lester Garland reports it from the mouth of Lytchett Bay.—**Salicornia pusilla* Woods. By the Fever Hospital, Poole; Hamworthy.—*Var. *gracillima* Townsend. With the type, Poole.—*S. appressa* Dum. D. Shore of Poole Harbour, west of Lytchett Bay, *L. V. Lester-Garland*. F. Hamworthy, near the station.

Polygonum maritimum L. 4. Mr. Lester withdrew his Swanage station given in *Fl. Bournemouth*, the year after it was published. —*P. Bistorta* L. Moist meadows, Edmondsham.—*Fagopyrum esculentum* Moench. Relic of cultivation (for pheasants' food), Goatham.—*Rumex pulcher* L. F. Waste ground near Edmondsham House; near Blandford towards Pimperne. G. In some quantity on the way to Chapman's Pool from Kingston.

Daphne Mezereum L. All the records but one in the extreme west of the county are old notices of Pulteney. In Cranborne Chase it was no doubt wild, but it is doubtful whether any survives which has not been taken into gardens. The Badbury plant (*Fl. Bournemouth*, p. 191) proved to be something else, when its discoverer went for specimens.—*D. Laureola* L. Hedgerows near Cranborne, and in Creech Hill Copse.—*Viscum album* L. Very fine on apple, thorn, lime and Black Poplar in Edmondsham Rectory grounds and at Edmondsham House on limes: in plenty between St. Giles' Church and St. Giles' House; and on Black Poplars along the exposed road from Cranborne to Handley. These poplars are all *P. canadensis* Desf.—*Thesium humifusum* DC. Bottlebrush Down near Cranborne.

Euphorbia platyphyllos L. In a brickyard near Verwood station. The Edmondsham locality is on a farm in Goatham, a hamlet, where the species was in profusion during the summer of 1906.—*Euphorbia exigua* L. F. Cranborne, very large plants. G. Seacombe, the same small prostrate form I have reported from near the Lighthouse, Durlstone Head; perhaps the original native form of the plant before it became a weed of cultivation.—*Mercurialis annua* L. Garden weed, Handley.

Parietaria ramiflora Moench. C. Preston; Osmington. F. Cranborne; Horton.

Carpinus Betulus L. F. Edmondsham Park, one tree, no doubt planted; St. Giles' Park, a few trees towards the north-west corner; Horton, one large old tree. G. Kingston.—*Cas-*

tanea sativa L. Edmondsham, in the Park and Furze Common Copse.

Salix triandra L. C. Dorchester. F. Holwell, Cranborne.—*S. fragilis* L. Common in Edmondsham and many parts of the county.—*S. alba* L. Infrequent. Horton; Gussage St. Michael; St. Giles'.—**S. alba* × *fragilis* (*S. viridis* Fr.). Two trees of some age, by the rivulet, Edmondsham, in the Rectory grounds.—*S. purpurea* L. Said to be "common" in the *Flora*. I think records are much wanted. D. Near Wareham, and some way north of Wareham, and towards Trigon Farm. F. Shapwick; Edmondsham. G. Stoborough meadows.—*S. rubra* Huds. "Frequent," *Flora of Dorset*. I have only seen it, D. north-west of Wareham, towards Trigon. F. Edmondsham; by the River Stour, Tarrant Crawford (var. *Forbyana* Sm.).

Populus canescens Sm. A large tree by the Lodge in Cranborne Road, and a few trees in Furze Common Copse, Edmondsham; St. Giles'.—*P. tremula* L. var. *glabra* Syme. Wood, Edmondsham; Blandford.—Var. *villosa* Lange. E. Shillingstone. F. West of Wimborne.—*P. nigra* L. Copses close to the village of St. Giles'.—*P. canadensis* Desf. Edmondsham; roadsides from Cranborne to Handley. In the *Flora of Bournemouth* all Black Poplars are entered under *P. nigra*; it is likely that some of these were forms of the N. American species.

Juniperus communis L. St. Giles' Park, dotted about the turf in what is very likely a native station; downs near Cranborne towards Handley and Pentridge.

Neottia Nidus-avis Rich. Bonslea Chase, Okeford Hill; frequent in the belt of woodland on the east and north-east of St. Giles' Park; "Hyles'," in an island patch of Gussage All Saints.—*Spiranthes autumnalis* Rich. Field near the gamekeeper's, Edmondsham, and in the above-named bit of Gussage All Saints; near Mount Pleasant, Horton. G. Near Corfe Castle, both east and west.—*Cephalanthera ensifolia* Rich. I believe the record for Creech Hill, which is the record for the county, is quite correct, but I have not found more than two or three small flowerless plants which may be it; the wood abounds in very fine *C. pallens* Rich.—*Epipactis latifolia* All. At the base of Hod Hill; plantation, Edmondsham, and roadside near Westworth Farm. - *Epipactis palustris* Crantz. In a water-meadow by the R. Cran, near Edmondsham. This is some miles north of the other record for this district, an old one by Pulteney. Canon E. R. Bernard tells me that it used to grow near High Hall, but is now extinct. It is stated by Wise (quoted in *Fl. Hants*) to be plentiful near Fordingbridge; I have not found the locality, which might well be in Dorset.—*Orchis pyramidalis* L. F. Chalky roadsides, &c., Edmondsham. G. Dancing Ledge.—*O. ustulata* L. Blagdon Down near Cranborne.—*O. Morio* L. Plentiful in Edmondsham, and remarkable for the great variety of colour from deep purple to pure white, and of the markings of the lip, in a field of rather light soil near Westworth Farm. *O. incarnata* L. Edmondsham, and by the River Cran, between

Cranborne and Goatham.—*O. latifolia* L. E. Shillingston. F. Edmondsham.—*O. maculata* L. E. Compton Abbas. F. Near Stourpaine, and Bonslea Chase; Edmondsham; Woodlands.—*O. ericetorum* Linton. Wet meadows, Edmondsham; rough pasture of a fibrous soil near Sutton Holms, in St. Giles' parish.—**O. ericetorum* × *latifolia*. Several specimens occurred in Long Meadow and a wet meadow by the River Cran, Edmondsham, 1906 and 1908.—**O. ericetorum* × *incarnata*. One specimen was found in a wet meadow, Edmondsham, by E. C. Linton, 1907, where both parents were growing together. This hybrid has not, I believe, been recorded previously.—*Ophrys apifera* Huds. By a chalk-pit, Holwell, and in a rough pasture, Edmondsham; on the Ackling Dyke, near Gussage St. Michael.—*Habenaria conopsea* Benth. Rough pasture between Edmondsham and Woodlands.—*H. bifolia* R. Br. Moist side of railway, Goatham.—*H. chloroleuca* Ridley. Woods, &c., St. Giles'; Sutton Holms; near Boveridge.

Iris fœtidissima L. C. Preston. F. Edmondsham; Cranborne.—*Galanthus nivalis* L. Bushy field border, Edmondsham, where it is likely to be native.—*Leucojum æstivum* L. Wet coppice, Shapwick, where it was pointed out to me by the late R. P. Murray.

Ruscus aculeatus L. Edmondsham; Cranborne; Boveridge. In the whole neighbourhood berries are very rare; all the many plants I have examined are female; male plants, or stamens I find none.—*Asparagus officinalis* L. Recorded by Pulteney in 1799 for Poole Harbour Sandbanks, and reported to me by Miss K. G. Firbank as plentiful there (1902).—*Allium ursinum* L. Local in the county, absent from the heath; Edmondsham.

Juncus effusus × *glaucus* (*J. diffusus* Hoppe). Rough wet pasture, Edmondsham.—*J. obtusiflorus* Ehrh. Wet meadow by the River Cran, between Holwell and Goatham.—*Luzula sylvatica* Gaud. Castle Hill Wood, Edmondsham; scarce.

Sparganium ramosum Huds. By the River Cran, between Holwell and Verwood.—*S. simplex* Huds. Goatham.—*Triglochin palustre* L. Valley of the Cran, in and near Edmondsham.—*Zannichellia palustris* L. In the rivulet, Edmondsham, where it has been detected more than one year flowering before the end of March.

Scirpus setaceus L. In two fields in Edmondsham nearly a mile apart.—*S. maritimus* L. E. In some abundance in the Stour near the bridge at Sturminster Newton, some twenty miles inland. F. Brickyard pools by Verwood Station, thirteen miles inland.—*S. sylvaticus* L. F. Wet thickety meadow-land by the Cran near Holwell.

Carex pulicaris L., *C. paniculata* L. Edmondsham.—*C. contigua* Hoppe. Most if not all the Dorset *C. muricata* auct. must be transferred to this species.—*C. echinata* Murr. Valley of River Cran.—*C. gracilis* Curt. Cranborne to Verwood by River Cran.—*C. humilis* Leysser. This very local sedge can hardly be considered *rare* in the eastern part of the county,

though it is strictly limited to the chalk. It is in some abundance on Harley Down; Gussage Hill; Week Street Down and Thickthorn Down; and occurs also on downs near Blagdon Farm, Cranborne, both in Dorset and over the borders in Wilts, near the course of Bokerly Dyke.—* *C. montana* L. F. Moist woodland, Edmondsham, in some quantity over a limited area, safely entrenched in rather stiff soil, where it is very unlikely to be disturbed.—*C. strigosa* Huds. In some quantity along a ditch at the base of a wet slope occupied by copse, and in an adjoining wet meadow. New to the district, and recorded for only one other locality in the county.—*C. pallescens* L., *C. sylvatica* Huds., *C. binervis* Sm., *C. fulva* Host., *C. flava* L., all in Edmondsham.—*C. flava* × *fulva* Verwood.—*C. Œderi* Retz., var. *œdocarpa* And., *C. hirta* L. Plentiful, Edmondsham.—*C. inflata* Huds. By the River Cran, near Holwell.

Panicum Crus-Galli L. Branksome Park, *Rev. H. H. Slater*; Parkstone, *H. J. Goddard*!—*P. miliaceum* L. C. Cornfield and waste ground, Upwey! Broadwey! Radipole; Pye Hill and Westham, Weymouth; garden weed, Nottington, *H. J. G.* F. Lilliput, Parkstone.—*Sorghum halepense* Pers. A south European species, sent me unnamed. C. Near Weymouth gasworks, *H. J. G.*! —*Setaria glauca* Beauv. Parkstone, near St. Luke's Church! and near St. Lawrence's Church, Sandbank Road, *H. J. G.* Longfleet Allotments.—*S. viridis* Beauv. C. Broadway, and Hillfield Gardens; also Nottington, neglected gardens, *H. J. G.* F. Ringwood Road, Longham, *H. J. G.*—*Spartina Townsendi* H. & J. Groves. D. Lytchett Bay; Lake, Hamworthy, Holes Bay; *H. J. G.* F. Parkstone; Sterte, Longfleet, *H. J. G.* (see *Journ. Bot.* 1908, 80, where Mr. Goddard's initials are incorrectly given, for an account of the rapid extension of this grass in Poole Harbour.)

Milium effusum L. Woods, Wimborne to Cranborne; Cold Harbour, St. Giles'; *H. J. G.*—*Agrostis setacea* Curtis. Abundant on heaths from Bournemouth and Wareham to Verwood and Alderholt; but not occurring on "downs" as stated in local floras.—*Calamagrostis epigeios* Roth. F. In some quantity in a coarse pasture on the borders of Rimes' Copse, Edmondsham. G. Corfe Castle to Church Knowle.—*Gastridium lendigerum* Gaud. C. Southdown Cliffs, Weymouth, *H. J. G.*! F. Brickyard by Verwood Station.—G. Warbarrow Bay, *H. J. G.*—**Apera Spica-venti* Beauv. In considerable quantity in the eastern end of Poole Park, 1908, *H. J. G.* Quite likely soil, &c., for this grass to occur naturally. On the other hand much of the grass in the park has been laid down or sown.—*Corynephorus canescens* Beauv. Is not confirmation of Pulteney's record needed? Miss E. Armitage has sent me a very pertinent suggestion, *viz.* that *Agrostis setacea*, which is abundant on heaths round Poole Harbour, is deceptively like *C. canescens* in the earlier stage before its panicle opens out in flower, and might easily be mistaken for it. It is true that Pulteney mentions *A. setacea* for Dorset, *viz.* for Puddletown and sea-coast near Weymouth, in district C; but he

does not appear to record it for any part of the county near Poole Harbour, where it abounds. On the whole, I think Miss Armitage may have hit on the right explanation.

Deschampsia flexuosa Trin. C. Martin's Town, *H. J. G.* F. Branksome and Sandecotes, *H. J. G.*—*Avena pubescens* Huds. C. Upwey, *H. J. G.* F. Edmondsham.—*A. pratensis* L. Kingsdown, *H. J. G.* Edmondsham to St. Giles'.—*Catabrosa aquatica* Beauv. Edmondsham.—*Briza minor* L. Parkstone and at the S.W. Pottery; plentiful in fields between Ferndown and West Moors, and West Moors to Cross Keys, *H. J. G.* Verwood towards Edmondsham and Goatham.—**Lamarckia aurea* (L.) Moench. Neglected garden, Upton, near Poole Harbour, 1906, *H. J. G.*! This beautiful south European grass was sent me unnamed.

Poa nemoralis L. On some old turf under trees in the premises of Edmondsham Rectory, apparently native.—*P. pratensis* L. var. *subcærulea* Sm. Hamworthy! *H. J. G.*—*Glyceria fluitans* × *plicata* (*G. pedicellata*, Townsend), plentiful in a water-course, Edmondsham, and in the summer of 1908 much affected with ergot.—*G. distans* Wahl. Abundant at Sterte (sea-wall) and Baiter, Poole, *H. J. G.*—*Festuca procumbens* Kunth. Near Creekmoor and Holes Bay signal-box and Sterte Esplanade, Poole, *H. J. G.*—*F. rigida* Kunth. C. Broadwey; Radipole; Lulworth; *H. J. G.* Osmington. F. Edmondsham.—*F. rottbœllioides* Kunth. C. Portland; Chesil bank and near Ferry Bridge, *H. J. G.*—*F. rubra* L. var. *pruinosa* Hackel. G. Seacombe.

Bromus ramosus Huds. C. Upwey; Broadwey; Portesham; Abbotsbury, *H. J. G.* E. Sturminster Newton; Buckland Newton, *H. J. G.* F. Upton; Durweston, *H. J. G.* Woodlands; Edmondsham.—*B. erectus* Huds. C. Railway banks, Upwey! *H. J. G.* E. Near Compton Abbas. F. Abundant on and about Bokerly Dyke, near Blagdon Farm, in both Dorset and Wilts.—*B. secalinus* L. Field of rye, Edmondsham, 1905.—**B. unioloides* Kunth! Neglected garden, *H. J. G.* (sent me under another name).—*B. hordeaceus* L. var. *glabratus*. This sub-glabrous variety was sent me from Bourne Valley by Mr. Goddard. It had previously appeared in a sown grass and clover field between Edmondsham and Verwood station.

Lolium temulentum L. Parkstone about Oaklands, and Sandbanks Road, *H. J. G.*—Var. *arvense* With. C. Upwey, *H. J. G.* —*Agropyron caninum* Beauv. C. White Nose, *H. J. G.* E. South of Sturminster Newton, *H. J. G.* F. Lilliput, Parkstone; Durweston and Fiddleford, *H. J. G.* Edmondsham.—*A. junceum* Beauv. A. Burton Bradstock, *H. J. G.* C. Radipole and Rodwell.—*Hordeum secalinum* Schreb. C. Chickerell, *H. J. G.* E. Sturminster Newton; Hinton St. Mary; Buckland Newton, *H. J. G.* F. Edmondsham. G. Seacombe.—*H. murinum* L. This species is irregularly distributed in Dorset. I have not noted it in the heathland; and it seems scarce in north-east Dorset. E. Margaret Marsh. F. Cranborne.—*Elymus arenarius* L. Constitution Hill, and on a bank near Dane Court Cricket field, Parkstone! South Haven, opposite Branksea Island, inflorescence

plentiful, 1908, *H. J. G.* The occurrence at the two first localities, a mile or more from the nearest point of the harbour, and two miles from the nearest coast, is, to say the least, unusual.

Lastræa Oreopteris Presl. Boggy spot in a wood adjoining Sutton Holms.—*L. cristata* Presl. This is given in the *Dorset Flora*, but seems to want confirming. The late R. P. Murray was shown the specimens in hb. Mansell-Pleydell, and was of opinion that they were not conclusive. Mr. Arthur Bennett once told me he had seen no Dorset specimen.—*Ophioglossum vulgatum* L. Several fields in Edmondsham and in the adjoining bit of Gussage All Saints which lies between Edmondsham and Verwood station.—*Botrychium Lunaria* Sw. In small quantity but very fine, in a field on the borders of Edmondsham.

SAPIUM IN THE COLLECTIONS OF RUIZ AND PAVON.

By James Britten, F.L.S.

The references by Mr. Hemsley, in his valuable descriptions of *Sapium* (Hook. Ic. Plant. tt. 2878–2900), to the collections of Ruiz and Pavon in the National Herbarium seem to show that the source of these important series—for there are two—is insufficiently understood. The matter, of course, is not one of primary importance, but as time goes on the history of our public herbaria becomes increasingly difficult to trace, and it seems worth while to put on record any definite information regarding them.

The following are Mr. Hemsley's references, which I have numbered for the sake of convenience.

1. t. 2893. *Sapium pedicellatum* Huber. "Mexico: without locality, *Ruiz and Pavon* . . . figure . . . prepared . . . from specimens preserved in the British Museum."

2. t. 2894. *S. Ruizii* Hemsl. "Mexico or Central America: without any special locality, *Ruiz and Pavon.* This plate was prepared . . . from specimens in the British Museum, on the sheet of which is written '*Hippomane glandulosa* de Mexico,' and 'Central America' appears in the same sheet. According to Lasigne (Mus. Bot. Deless. p. 322) the Mexican plants of Ruiz and Pavon's herbarium in the British Museum 'paraissent avoir formé une partie de l'herbier de Mociño et Sessé."

3. *S. simile* Hemsl. "Central America: without locality, Ruiz and Pavon. The specimen in the British Museum is labelled '*Hippomane eglandulosa* Ruiz and Pavon, N.E.'—*i. e.* Nouvelle Espagne, the geographical limits of which are obscure. 'Central America' appears on the same sheet."

4. t. 2896. *S. utile* Preuss. "At the British Museum there are specimens of a *Sapium*, labelled 'Peru, Herb. Pavon, *Sapium Aucuparium* sp. nov. Ruiz et Pavon, de Huayaguil.'"

In the first place it may be noted that, as has been said, there

are in the National Herbarium two sets of the plants of Ruiz and Pavon. The first and more important is that which was purchased for the Museum at the sale of Lambert's herbarium in 1842 for the sum of £270; it is thus described in the sale catalogue:—"103. Ruiz and Pavon's Magnificent Herbarium, as Arranged and Mounted by Mr. Lambert, in the large Cabinet, with 3 additional bundles. This most important and invaluable collection embraces from 1500 to 1750 species. A Cabinet with Drawers, containing about 75 small boxes of dry Fruits, belonging also to Ruiz and Pavon's Herbarium (See Prof. D. Don's description of this collection in the Appendix to Lambert's *Genus Pinus*); of the *Palmæ* there are about 16 species, *Laurinæ* 11 ditto, *Myristicæ* 7 ditto and a large number of other very interesting specimens, and sundry sections of woods; also a Box containing about 30 specimens of Cinchona and other Barks, and the original Manuscript, which came into Mr. Lambert's possession at the same time, *viz.* Ruiz (H.) and J. Pavon's Original Manuscripts in Spanish, of their Voyages, Travels, and Botanical Researches in Peru and Chile, 1777–88, consisting of their Journals, Lists, and Descriptions of the Plants, Insects, &c., of Peru and Chili, a large quantity, filling a mahogany box 20 inches by 15; also a box containing a quantity of miscellaneous Fruits and Seeds."

It is this collection that is referred to by Laségue in the passage quoted (2) by Mr. Hemsley, but the suggestion as to the plants of Mociño and Sesse did not originate with him, but with David Don, in the Appendix to Lambert's *Account of the Genus Pinus*, p. 32. Ruiz and Pavon do not appear to have visited Mexico, and Don had no doubt some reason for his suggestion, although the labels on the Mexican specimens in no way differ in style from those on the rest of the plants, and I have found no internal evidence in support of the suggestion.

To this collection only the specimen of *S. utile* (4) belongs; the name and locality are in Ruiz's writing (as are all the rest of the tickets cited and throughout the herbarium), "Peru, Pavon," having been added on the back of the sheet by Lambert, as is the case with all those belonging to the herbarium above described. The label, which is not quite accurately transcribed in Ic. Pl., runs: "*Sapium aucuparium* de Huayaguil."

The second collection consists of specimens which were acquired in Shuttleworth's herbarium in 1877; it is quite possible that these also formed parts of Lambert's herbarium, for besides the collection acquired for the British Museum, there were sold at the sale two sets of Ruiz and Pavon's plants, which were bought by Pamplin for £71 and £177 respectively, the former containing "not less than 2500 plants," in 53 large bundles, the latter "an arranged collection in 36 large bundles." Pamplin was a well-known dealer in herbaria, and Shuttleworth may well have acquired the plants from him; De Candolle (*Phytographia*, 445) definitely mentions "640 venant de l'herb. de Lambert" at the University of Greifswald, and Colmeiro (Bosq. Hist. Jard. Bot. Madrid, 88)

states that 2980 of their Peru and Chile plants are in the Madrid Herbarium.

The specimens from Shuttleworth which have supplied most of Mr. Hemsley's Museum material were mounted recently on ordinary Museum paper, and the words "Central America" (2, 3) form no part of the original labels, but are merely printed on the back of the sheets; *S. Ruizii* (2) is, as Mr. Hemsley quotes, definitely labelled "de Mexico." The MS. name of *S. simile* is not *eglandulosa* but *eglandulata*; it occurs also in a list towards the end of vol. ii. of Ruiz & Pavon's MS. "Descripciones," but I find no description. Among the Shuttleworth specimens is also *S. utile*, with a label already mentioned—"*Sapium aucuparium* sp. n. de Huayaguil."

There seems no authority for localizing *S. pedicellatum* (1) in Mexico: the label runs "*Stilingia arborea* N.E."; another sheet, doubtfully identified with this by Mr. Hemsley (in herb.) is labelled "Stilingia sp. n. N. E."

It may be added here, for convenience of future investigators, that the reference under t. 2890 (*S. Hippomane*) to "Plukenet's herbarium (Hb. Sloane vol. iv. pp. 82 and 111)" would be more correctly given as "Plukenet's herbarium in Hb. Sloane vol. xcviii. f. 111; vol. cii. f. 82." The two volumes are indeed indicated on the title-pages as Plukenet's vol. iv., but it is better for purposes of reference to cite the numbers they bear in Sloane's herbarium: the specimens were collected by Plukenet in the Royal Gardens at Hampton Court.

REPORT OF DEPARTMENT OF BOTANY, BRITISH MUSEUM, 1907.

By A. B. Rendle, D.Sc., F.R.S.

The following additions have been made to the collections by presentation:—The herbarium of the late Rev. R. P. Murray, from Mrs. R. P. Murray; 12 specimens of seeds from Sikkim, from Capt. Gage; 22 phanerogams from New Guinea, from Capt. F. R. Barton; 138 phanerogams from the Curator of the Sarawak Museum; 54 phanerogams from neighbourhood of Shanghai, from F. W. Styan, Esq.; 78 phanerogams and 15 cryptogams from Fiji, from Miss L. Gibbs; 24 phanerogams from West Australia, from O. H. Sargent, Esq.; 9 specimens of Australian woods from Millar's Karri and Jarrah Co.; 32 phanerogams and 4 ferns from South Nigeria, from A. E. Kitson, Esq.; 114 phanerogams and 1 cryptogam from Nigeria, from C. C. Yates, Esq.; 27 phanerogams from Uganda, from E. Brown, Esq.; 118 specimens from Rhodesia, from E. C. Chubb, Esq.; 43 phanerogams from Rhodesia, from Dr. R. F. Rand; 8 specimens of fruits from West Indies, from A. E. Aspinall, Esq.; 390 specimens from Chili, from R. M. Middleton, Esq.; 40 phanerogams from Patagonia, from Dr. P. Dusén; 9 specimens of cultivated plants from Walter Ledger, Esq.; 73 ferns of New Zealand and 100 ferns of

tropical Asia, from Llewellyn Lewis, Esq.; 7 growth-forms of *Asplenium Bradleyi*, from Tennessee, from R. M. Middleton, Esq.; 227 algæ of Barbados, from the executors of the late Miss Anna Vickers; 48 tubes of Plankton collected in the African Lakes, by Dr. W. A. Cunnington, from the Tanganyika Committee; 33 marine algæ of the Danish West Indies, from Dr. F. Börgesen; 26 Australian Lichens, from Edwin Cheel, Esq.; 23 Mycetozoa from the Philippine Islands, from E. D. Merrill, Esq.

The additions to the British Herbarium by presentation have been:—The British Herbarium of the late John Benbow, Esq., of Uxbridge, from A. J. Benbow, Esq.; 35 specimens from C. E. Salmon, Esq.; 17 specimens from Rev. E. F. Linton; 205 specimens from Rev. E. S. Marshall; 15 specimens from W. H. Beeby, Esq.; 5 specimens from Rev. H. J. Riddelsdell; 74 specimens of Rubi from Rev. W. Moyle Rogers; 30 specimens of potamogetons from A. Bennett, Esq.; 3 specimens from W. P. Hiern, Esq.; 2 specimens of diseases of cultivated trees, by W. Gamble, Esq.; 2 rare British marine algæ, by A. D. Cotton, Esq.; 2 fungal diseases of insects, by E. R. Bankes, Esq.; 2 microscope-preparations from a Scottish glacial peat deposit, by H. N. Dixon, Esq.

The following additions have been made by exchange of duplicates:—265 phanerogams and 28 ferns from Malaya, from the Director of the Botanic Gardens, Singapore; 139 phanerogams and 6 cryptogams from South Africa, collected by R. Schlechter, from the Director of the Botanic Museum, Zurich; 78 phanerogams from South Africa, from Dr. H. Bolus, Cape Town; 18 specimens of West Australian Orchids, from Oswald Sargent, Esq., West Australia; 250 ferns from the West Indies and Mexico, from the U.S. National Herbarium, Washington; 74 phanerogams, chiefly from the West Indies and Venezuela, from the Director of the Botanic Museum, Copenhagen; 341 phanerogams and 119 cryptogams from the Director of the Museu Goeldi, Para, Brazil; and 200 cryptogams from the Hofmuseum, Vienna.

The principal purchases during the year were:—990 phanerogams and 16 cryptogams from Hungary, Bosnia, &c., from C. K. Schneider; 194 phanerogams and 6 vascular cryptogams, "Flora Stiriaca exsiccata," fasc. 11–14, from Hayek; 50 specimens "Salicetum exsiccatum," fasc. iii., from Toepffer; 50 specimens "Batotheca Europæa," fasc. vi., from Sudre; 603 phanerogams and 102 cryptogams from Japan and Korea, from Rev. U. Faurie; 319 phanerogams and 117 cryptogams from China, from Father Hugh; 50 phanerogams and 5 vascular cryptogams from Java, from Buysman; 264 phanerogams and 9 vascular cryptogams from N.W. Rhodesia, from Theo. Kässner; 128 specimens from German East Africa, from W. Büsse; 84 phanerogams from German East Africa, from Scheffler; 362 specimens from Cameroons, from Zenker; 2807 phanerogams and 37 cryptogams from Angola, from John Gossweiler; 470 phanerogams and 6 vascular cryptogams from Montana, from J. W. Blankinship; 55 phanerogams

and 2 Equisetaceæ from Washington, from W. N. Suksdorf; 49 phanerogams and 75 cryptogams from Costa Rica, from Tonduz; 159 phanerogams and 3 cryptogams from South Bolivia, from Fiebrig; 284 phanerogams and 25 cryptogams from Brazil, from P. Dusén; 337 phanerogams and 39 cryptogams from New Caledonia, from R. Schlechter; 60 specimens "Gramineæ," Lief. xxiii.–xxiv., from Kneucker; 902 microphotographs of woods illustrating minute structure, from J. A. Weale, and single specimens from C. C. Tatham and Mrs. Brittan; 218 cryptogams of the Ionian island of Leucadia, from Mrs. Baden-Powell; 90 pteridophytes of South America, &c., from Rosenstock and Schroeder; 34 Muscineæ from South Africa and Siam, from Wilms and Hosseus; 60 Musci Americæ Septentrionalis, from Renauld and Cardot; 138 Canadian mosses, from Macoun; 50 mosses of the Indian and Polynesian Archipelago, from Fleischer; 464 mosses and hepatics of Sikkim, Guatemala and Mexico, from Levier; 20 American hepaticæ, from Haynes; 50 hepaticæ Europææ from Schiffner; 150 North American marine algæ, from Collins, Holden, and Setchell; 50 fungi selecti and 40 Myxomycetes, from Jaap; 50 fungi imperfecti, from Kabát and Bubák; 200 fungi columbiani, from Bartholomew; 50 Ascomycetes, from Rehm; 100 Micromycetes rariores selecti, from Vestergren; 50 Uredineæ, 25 Ustilagineæ, and 100 German fungi, from Sydow; 50 Westphalian fungi, from Brinkmann; 16 prepared British fungi, from Hartley Smith; 66 new or rare British fungi and 46 microscope-preparations, from Miss A. Lorrain Smith; 100 Russian lichens from Elenkin.

BIBLIOGRAPHICAL NOTES.

XLVIII.—John Hawkins and his Plates.

I.

We have in the Department of Botany a copper-plate engraving of *Cinchona* which was received from the British Museum as a duplicate in December, 1888. It does not appear, however, to have been a duplicate, as no copy is at present in the library at Bloomsbury. The history of the plate, though not of great importance, may nevertheless be worth placing on record.

The plate measures $16\frac{1}{2}'' \times 14\frac{1}{4}''$ without margin, and is inscribed "Johannes Hawkeens Philobotan. exemp. sic. delin. 1739: J. Mynde sculp." There is no name for the plant on the plate; the various details are indicated by letters, but there is no printed explanation, although space was left for this, and an explanation has been added by Hawkins in MS.

The plate (reversed) was re-engraved for Lambert's *Description of the Genus Cinchona* (1797)—not, however, it would seem, from the original, but from a reproduction of it which appeared in 1756 appended to a publication by Jacob de Castro Sarmento entitled *De uso e abuso das Minhas agoas de Inglaterra*, Londres, 1756,

with which, as Dryander has noted on Banks's copy of the plate, "it has no sort of connection." This plate is headed "Arvore da Quina Quina," has at the foot a printed description in Spanish of the details represented, and is lettered "F. Garden sculpt."; there is no publisher's name. It measures without margin $16\frac{1}{4}'' \times 14''$. Although inferior in execution, it is carefully copied from the original, but advantage has been taken of a vacant space to add another figure, described as "o fruto desta Arvore," which is that of a *Myroxylon*—also known as "Quina Quina"; Banks has written in pencil upon the plate: "The fruit marked Q is copied from another plate of a different plant drawn likewise by Hawkins"; to this we shall return. Lambert (*l. c.* 18) says of the plate: "It is somewhat extraordinary how it came into the publisher's possession. It seems to be very little known, and has not been quoted by any author, I believe, except Dr. Pulteney, in his *Diss. de Cinchona* [1764], and who informed me that his figure was communicated to him by Dr. Hope of Edinburgh. Mr. Hawkins, now living at Dorchester, Dorset, a contemporary of Sir Hans Sloane, and with whom he lived for some time in the latter part of his life, was so obliging as to favour me with an impression of this plate, accompanied with the following letter." The letter, which is dated Dorchester, Oct. 12, 1795, says: "The specimens which I made the drawing from came inclosed in a large quantity of the bark, several pieces of wood with the bark on, and branches of the leaves in flower and seed, packed up in a cow or ox-hide, as a present from Mons. Condamine (then residing in Peru) to Dr. Cromwell Mortimer, Corresponding Secretary to the Royal Society in the year 1740. The specimens were in a dried crumpled state, which I expanded by means of warm water, in order to complete the drawing. The plate was engraved at the expence of the Royal Society, has since been lost, and cannot be found, as Sir Joseph Banks told me when I was in London." About the same time Banks had been inquiring of Hawkins's son as to the origin of the plate*; the information given in his letter to Banks in the Department of Botany, dated Feb. 8, 1794, is somewhat more detailed than in the letter printed by Lambert; having stated that Dr. Mortimer, "my relation," received the bark, wood, and leaves of the tree from De la Condamine, he continues: "I being then an apprentice in London, having pleasure in the study of Botany, drawing Plants, &c., Doctor Mortimer gave me the several specimens that I might form a drawing to be engraved for the Royal Society."

The reproduction by Pulteney to which Lambert refers is a small octavo plate containing the flowering branch and a few details: it was evidently taken from Hawkins's original, as Pulteney, in acknowledging its source, spells his name "Hawkeens"—the spelling which appears on the plate. On the copy of the

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* This must have been the copy from Sarmento's book, as Dryander (Cat. Bibl. Banks, iii. 475 (1797)) speaks of the original Hawkins plate as "nobis desiderata."

Dissertatio in the Linnean Society's library—the only one I have seen—is a MS. note by Pulteney, pointing out (as is evidently the case) that the second and fourth pair of leaves were due to the "manus indoctus" of the artist: "nollem tamen mutare delineationem plantæ, ab amico receptam." This friend, as we have seen, was James Hope, then professor of botany in Edinburgh. Pulteney and Lambert letter their plates *Cinchona officinalis*.

II.

In the letter to Lambert already quoted Hawkins continues: "Also were included in the same parcel specimens of the plant with the three leaves along-side of the main stalk, as represented in the drawing you had before of me with the kidney-shape seed." To this Lambert adds a footnote stating that he had presented the drawing to the Linnean Society and that it would appear in vol. iii. of the *Transactions*, where we duly find it (t. 12, p. 59) with a note: "Tab. 12 represents the ancient Quina Quina etched by Mr. Hawkins from the original specimen in 174 (*sic*), and which is here re-engraved, the old plate being lost." In the letter to Banks before quoted, Hawkins writes: "I also made a drawing of the uncommon form'd specimen, with the triangular stalk with thick farinaceous winged leaves set on every side w̄h he [de la Condamine] called Quina Quina, the drawing of w̄h I enclose for your acceptance, a foul copy of the same I gave to Mr. Lambert." This drawing, or rather copper-plate engraving, is lettered "Quina-Quina Prima," "J. Hawkeens delin. & sculp. 1742." There are three figures on the plate: A. the "specimen with triangular stalk," &c.; B. "a transverse section of the stem and leaves"; C. "the seeds, of a brown colour and woody substance"—the last are of a species of *Myroxylon*, probably *M. punctatum* Kl., which, according to the labels on Ruiz & Pavon's specimens in the National Herbarium, is called Quino-Quino in Peru. Banks says that these were the original of the figure "copied from another plate of a different plant drawn likewise by Hawkeens," which is added to the plate of *Cinchona* already described (see foregoing); but if this be so, the engraver, strictly accurate in reproducing the *Cinchona*, has taken remarkable liberties in this instance.

As almost all that is known of Hawkins is scattered through the foregoing citations, it may be well to bring it together in connected form. In 1740 he was "an apprentice in London"—probably to a surgeon, as he afterwards became one—with a taste for botany—he puts "philobotan." after his name on the *Cinchona* plate—and related to Cromwell Mortimer, Corresponding Secretary to the Royal Society. In the latter part of Sloane's life he lived with him, perhaps as medical attendant; some of the latest entries in the MS. Catalogue of Sloane's "Collection of Vegetables"—*e. g.* n. 12522—appear to be in his hand. After Sloane's death, Hawkins settled as a surgeon at Dorchester, Dorset, where he was living when he wrote to Lambert in 1795.

In the Sloane Herbarium are eight volumes (H. S. 325–332) lettered "Hawkins Collections" and described on the title-pages as "Plants from several parts of Europe, Asia, Africa, and America from Mr. Petiver's and Sir Hans Sloane's collections: put together by Mr. Hawkins and mostly referred by him to Mr. Ray [Hist. Plant.]." These specimens, which are well selected, carefully mounted, and well preserved, are not, as might be inferred from the description, duplicates of those in the Sloane Herbarium; and it is probable that Hawkins occupied part of his time while with Sloane in arranging these latest volumes of Sloane's collections. Some account of the contents will be given in the forthcoming History of the Sloane Herbarium.

JAMES BRITTEN.

SHORT NOTES.

THE ADAPTATION OF PLANTS.—Some remarkable instances of the adaptability of plants came before my notice this summer in Switzerland. In a wooded valley near Engelberg, at an elevation of about 4000 ft., I rested by an irregular limestone slab, about 20 ft. × 10 ft. × 3 ft., having a more or less uniform slope of about 30°, similar to that of the forest path. I counted no fewer than sixty different kinds of flowering plants, ferns, and mosses on that rock, though the accumulation of humus averaged only half an inch, and it varied in depth from three inches to nothing. And yet on that slab were a spruce fir 8 ft. high, a willow 5 ft. high, a mountain ash of 6 ft., large raspberry and blackberry bushes (three kinds, including *Rubus saxatilis*), a bush of *Ribes alpinum*, and another of *Rosa alpina* (not flowering). There were three ferns, three mosses, one lichen, and *Marchantia polymorpha*. The phanerogams included three grasses, two sedges (*C. digitata* and *C. silvatica*, both very characteristic of limestone woods), three scattered specimens of *Orchis maculata*, and a couple of twayblades. The remaining flowering plants comprised twenty species widely spread in the lowlands of Switzerland and Great Britain, such as *Oxalis Acetosella*, *Lotus corniculatus* (a most ubiquitous plant, reaching 9000 ft. in the Alps), *Viola silvatica*, *Fragaria vesca*, *Campanula rotundifolia*, and *Mercurialis perennis*; and sixteen species of alpine or sub-alpine plants, such as *Viola biflora*, *Adenostyles alpina*, *Circæa alpina*, *Scabiosa lucida*, *Saxifraga rotundifolia*, *Spiræa Aruncus*, *Arabis alpina*, *Phyteuma spicata*, and *Majanthemum bifolium*, &c. The trees in the immediate neighbourhood of this rock were spruce, beech, sycamore, and mountain ash, two of which kinds were endeavouring to get established on the rock itself. The most imposing flowering plants in the vicinity which had *not* got a footing on the rock were *Ranunculus aconitifolius* and the handsome mauve spikes of *Mulgedium alpinum*, both of which presumably would require more water than that afforded by the dripping of the trees. The humus on

such rocks is generally composed of decaying needles of firs or pines, and it is surprising how soon such plants as Sedums, Sempervivums, and Saxifrages establish themselves upon it, and thus gradually it gets consolidated and matted together. Again, I was astonished to find large clumps of the common meadow-sweet (*Spiræa Ulmaria*) growing at the foot of perpendicular cliffs some 4500 ft. above the sea, near the road to the Grand Saint Bernard. It is admitted water was dripping from the rocks, but at the base of the cliff was a steep stony scree, only partially covered with vegetation, and yet there was no sign of any meadow-sweet in the valley of the Drance itself, which flows a few hundred feet below on the other side of the road.—H. S. Thompson.

A Radicula-Hybrid.—Whilst paying attention, during the past season, to the plants growing by the River Thames above Putney, I have had under observation a form of *Radicula*, obviously not identical with any one of the three yellow-flowered species also growing by the river. This form appears to be a hybrid not previously noticed for this country, namely, *Radicula amphibia* × *palustris*. It recalls *R. amphibia* by the tall robust stems, usually many in number, arising from an undergrouud rhizome, and *R. palustris* by its deeply pinnatifid leaves and pale yellow flowers. These latter are very much smaller than those of *R. amphibia*, but are larger than the flowers of *R. palustris*. It is an infertile hybrid with barren stamens somewhat shorter than the pistil, which swells to but a small extent, and does not produce seed. The inflorescence in its ultimate growth is profusely branched, and the plant is then very noticeable by reason of the long branches with aborted silicules borne on divaricate or declining pedicels. I have traced this hybrid from Putney to Richmond along the Surrey side of the river. It is quite abundant on the sloping river-wall near Hammersmith Bridge; elsewhere, as at Mortlake, Kew, and Richmond, it occurs rather sparingly. Wherever it grows it is accompanied by both *R. amphibia* and *R. palustris*, and occasionally *R. sylvestris* is to be found close at hand, but no trace of this latter species appears in the hybrid. Mr. Britten, who kindly compared examples of this form with the *R. amphibia* and *R. palustris* series in the British Museum, could not find any form like it in the British collection, but specimens in the general collection from Herb. Auerswald are somewhat similar. No mention of this hybrid is made in Focke's *Pflanzenmischlinge*. Under the name of × *Roripa erythrocaulis* Borbás it is described in Rouy & Foucaud's *Flore de France*. — C. E. Britton.

Leicestershire Plants.—A week or so ago I found *Scirpus compressus* Pers., which is new to the county, growing in quite a small isolated boggy patch of ground in a hay-field close to Norton Gorse, King's Norton, Leicestershire. The spot had previously yielded a rare moss, *Mnium affine* and var. *elatum*. At the same place though nearer the village itself also, curiously enough, I found

Pylaisia polyantha, a very rare Midland moss, a year or so ago. All around this little bog, just as in the case of *Œnanthe Lachenalii*, at Crown Hill and Scraptoft, all was ordinary, uninteresting grassland—just mown at this season. The plants growing in association with it were *Eleocharis palustris*, *Triglochin palustre*, and *Orchis incarnata* (one plant), various common *Epilobia*, *Juncus effusus*, *J. conglomeratus*, *J. articulatus*, *J. sylvaticus*, and a good deal of *Inula dysenterica*. The *Scirpus* covered a small patch about ten yards square, to the exclusion of almost anything else. It is, indeed, truly astonishing that this plant should turn up in so apparently unlikely a situation, though in a quite out-of-the-way spot, after so many years' search, and failure to find it elsewhere. But the same remarks apply equally to *Œ. Lachenalii*. When walking with the Rev. H. P. Reader, M.A., from Stathern station to Branstone recently, I found what I took to be root-leaves of *Carum segetum* Benth. & Hook. fil., growing upon a high hedge-bank on the hilly road between the two places, which at this point would be about 500 ft. above sea-level, situated upon the Middle Lias Marlstone, a sandy calcareous formation. They turned out to be really leaves of *C. segetum*, and not *Sison Amomum* as we thought might be the case, for Father Reader detected the mature plant further along the same road. The road or track itself is an old one, and not upon any high road, so that there is little traffic. It seems that it is a native here, and may be at Hungarton, where it grows below a marlstone wall. *S. Amomum* also, though considered to be universally distributed, is by no means so, *east* of the River Soar; it has not been seen elsewhere by the writer, and is known to Father Reader in addition to this only from Ruydale some miles west.—A. R. Horwood.

Gyrophora spodochroa Ach.—This lichen was distributed by us this year through the Lichen Exchange Club of the British Isles from Langdale in Westmorland. It was first found there many years ago by Mr. J. A. Martindale of Staveley, who indicated the locality to us. We sent a note to this effect, with the specimens, to the Club Distributor, who has unfortunately not inserted it in the Report. As Mr. Martindale appears to have never placed his interesting discovery on record, this notice in the Report is the first indication of it as a British species. We desire to place on record the fact that any credit attaching to the finding of this new addition to our list belongs to Mr. Martindale and not to us. —A. Wilson & J. A. Wheldon.

Sisymbrium pannonicum.—In Central London during the past season this alien species has been remarkably abundant on the vacant sites situated between the Strand and Aldwych. Here, among the bricks and rubbish, it has formed dense thickets. Elsewhere it has occurred in plenty in the neighbourhood of Wimbledon, and in less quantity along the towing-path by the Thames, in more than one place, between Putney and Kingston.—C. E. Britton.

MATRICARIA SUAVEOLENS Buch. IN DENBIGHSHIRE.—While wandering in Denbighshire recently, I noticed several examples of the alien *Matricaria suaveolens* Buch. by a farm called Plâs Ashpool about a couple of miles north of Llandyrnog. I am not aware whether this has been previously noticed in the county. In several places in the Liverpool district it is well established and has spread rapidly during the past few years. I suppose it is often introduced with foreign corn, as it frequently occurs in the vicinity of farmyards.—A. A. DALLMAN.

SONCHUS PALUSTRIS L.—The record of "53. Lincoln S. Bloxam sp. Dublin Herb.!" in Suppl. to Top. Bot. ed. 2, must be expunged, as correspondence with the Rev. E. A. Woodruffe-Peacock shows that since 1800 no place in S. Lincoln could have produced it; the specimen probably came from the East Fen, as Bloxam was at Revesby Abbey with Sir J. Banks.—ARTHUR BENNETT.

TILIA PLATYPHYLLOS Scop. IN WALES.—This interesting tree is enlarging the records of its British distribution. I found it, in a position precluding all doubt that it was native, on limestone rocks at Craig Cille near Crickhowell, Brecon, in company with *T. cordata* Hayne, on the 23rd day of August last. Altitude at about 1300 ft. This is, I believe, the first record for the Principality.—AUGUSTIN LEY.

BOTANICAL EXCHANGE CLUBS.—Mr. Britten's note in the May number of this Journal with regard to the duplication of notes published in the Reports of the Botanical Exchange Clubs seems to me to be only another point in favour of the amalgamation of those two useful societies. As the principal contributors are members of both clubs and usually send the same plants to each, a great deal of time is wasted every year in the unnecessary distribution of duplicate sets of specimens. The objection raised to the proposed union is that it would increase the membership of one club, and entail so much work on the part of the distributor that no one would care to undertake what is already a thankless and a tedious task. This objection can hardly be maintained, however, as the chief contributing members are common to both societies. It has also been suggested that the work of the club might have more useful results if the study of plant-distribution on œcological lines could be made one of its principal features, instead of merely the collection and distribution of rare and critical plants which when it leads to the extinction of rarities ought not to be encouraged. Only this year I am ashamed to say that members sent in at least one hundred specimens of an orchid which is all but extinct in England. I hope the members of both clubs will consider the desirability of adopting the course I and others have suggested.—A. BRUCE JACKSON.

REVIEWS.

Grundlagen und Ergebnisse der Pflanzenchemie. Parts ii. and iii. By Professor Euler, University of Stockholm.

The present volume is the completion of the treatise the first part of which was reviewed last year (Journ. Bot. 1908, 398). It includes two parts, the first of which deals with the general laws of vegetable life, and the second with the details of the chemical changes which take place in the plant body. Taken together with the first volume, in which the chemical substances which occur in plants were discussed, the book constitutes an attempt to expound the metabolic phenomena of the vegetable world.

The author has made a praiseworthy effort to do justice to his subject, but while his presentation from the chemist's standpoint is satisfactory he has not been so successful when he has entered the field of the physiologist. His treatment of the physical laws governing metabolism is comprehensive, but considerations of space prevent him from adequately discussing their bearings. The more purely physiological part of the work suffers from the same restriction. Consequently, the book tends to give the view that physiology is more limited by chemistry and physics than most physiologists would be inclined to admit. There is a certain lack of perspective which detracts from the value of the volume now before us. We may regard the author as somewhat too ambitious, trying to expound the phenomena of life too completely from the chemical side, and not laying sufficient stress on what for want of a better term we must call its biological features. He goes so far, indeed, as to speculate upon the molecular structure and orientation of the living protoplasm.

The effort to cover so much ground has given rise to a certain incompleteness in his presentation of the work of recent years. It is strange that the researches of English workers are in many cases ignored, and discoveries made by them are attributed to Continental writers of later date. Nor are all his references to writers of other nationalities always accurate in every detail.

The hopes that were excited by the appearance of the first volume have thus not met with so full a realisation as could be wished. At the same time the work, even with the limitations it displays, must be of considerable assistance to a large class of readers.

J. R. G.

Carl von Linné als botanischer Forscher und Schriftsteller. Von C. A. M. Lindman. Royal 8vo, pp. iv + 188. Jena: Gustav Fischer. 1908.

We have here a German translation of the memoir by Prof. Lindman which appeared in a volume issued in 1907 by the Royal Swedish Academy of Science, on the celebration of the two hundredth anniversary of the birthday of Linné.

It was but natural that the fellow-countrymen of the great Swedish naturalist should, on the bicentary celebration of his birth, set out anew the distinguished services to natural science which we owe to him. Modern biology has been built upon the foundations laid by Linné, but the full extent of our indebtedness is but dimly recognized. Linné's main works, his *Systema*, *Genera*, and *Species Plantarum* are still, and must continue to be, standard works of reference so long as we base our genera and species upon his labours. But besides these chief works there exist many others, which are hardly known to the modern worker, or, if known, are rarely consulted. Many are written in Latin, such as the theses which were collected and republished as the *Amœnitates Academicæ*; others exist in the original Swedish, but in these hurrying days few stop to read these bygone productions, the result being that to professor and pupil alike their contents are quite unknown.

Prof. Lindman has parcelled out his essay into various headings, beginning with Linné's early years and student life, his first writings, his artificial system, his *Systema*, *Genera*, and *Species Plantarum*. These principal works are considered in detail, and need not detain us here. The later portions of this essay will attract perhaps more attention, for the author dwells upon Linné's attempts at a natural system, the observations accumulated during his travels in Sweden, and his morphological and physiological remarks. With the exception of evolution, there is hardly a single department of botanical science which he did not investigate; his fancy was rich and exuberant, his knowledge of plant-life was ample and varied, his powers of work were remarkable—early and late he was immersed in his studies, recording facts and shaping theories to account for these facts. His unique personality attracted crowds of auditors, and his vivid lectures inspired many of those who had studied under him to cross the sea to investigate strange floras, and some even to lose their lives in the quest. How this was accomplished may be understood from the pages of this treatise, which, in its present form, will probably be more widely read than in its original dress.

B. Daydon Jackson.

Lehrbuch der Allgemeinen Botanik. By Warming-Johannsen. Translated from the fourth Danish edition, and edited by Dr. E. P. Meinecke. Second Part. 8vo, pp. 481–668, tt. 445–610. Berlin: Borntraeger. Price 4·80 m.

The second part concludes this edition of the Danish text-book, the German form of which will probably be found more convenient by many students and teachers. The present portion contains the remainder of the section on reproduction and development of the embryo and the two sections dealing respectively with the inflorescence, flower, and pollination, and fruit, seed, and dissemination. These are followed by chapters on the periods in

the life-history of plants, such as germination, juvenile stages, leaf-fall, and resting periods natural or induced, and on the relation of the life-history to external conditions. The part concludes with a chapter on classification, variability, atavism, and phylogenesis. The book as a whole forms a useful modern text-book of botany, well arranged and well illustrated.

A. B. R.

Elemente der Exakten Erblichkeitslehre. By W. Johannsen. Pp. 516, 31 figures in text. Jena: Fischer. 1909.

Whether biological questions are susceptible of solution by exact mathematical methods is a question which still excites some difference of opinion. According to *Biometrika* and those that write therein it is the key to all difficulties. According to others, as for example, Prof. Bateson (Mendel's *Principles of Heredity*, 1909), the reverse is the case. "That such work may ultimately contribute to the development of statistical theory cannot be denied, but as applied to the problems of heredity the effort has resulted only in the concealment of that order which it was ostensibly undertaken to reveal."

This, at any rate, may be said, that the work under notice contains a vast amount of information respecting the statistical and mathematical investigations which have been so far made in respect of the question of inheritance. The present reviewer confesses that, not being a mathematician, he is incapable of comprehending the stiffer parts of the book, but, in spite of this, enough remains to show that enormous pains have been taken in accumulating the store of information gathered therein for the use of workers in these fields.

BOOK-NOTES, NEWS, &c.

We much regret to have to record the death of Mr. Hastings Charles Dent, F.L.S., &c., on 6th March last, at his residence, The Homestead, South Godstone, Surrey. Born in 1855, the elder son of the late Colonel and Lady Beaujolois Dent, he was educated privately, later taking up the profession of a Civil Engineer. In that capacity he aided in laying down the first tramway lines for the City of Manchester, and in 1884–5 spent a considerable time in the province of Minas Geraes, Brazil, on an important railway survey. It was upon his return home, when this survey had been accomplished, that he published *A Year in Brazil*, which had a large circulation and gave a comprehensive account of his sojourn in Brazilian wilds, and which abounds with botanical and zoological jottings and notes, with detailed catalogues of his various collections, which were carefully worked out by various experts. His gatherings of botanical specimens, though not large, are very

interesting, and he generously presented the whole of these to the author of this notice. One, a *Habenaria*, proved new to science, and was described by Mr. H. N. Ridley in the pages of this Journal (1885). In 1886 Mr. Dent travelled round the world in company with the present Earl of Harrowby, and again made considerable collections in Natural History; among other plants of interest he particularly studied the wild *Chrysanthemum sinense* at the Ming Tombs and elsewhere near Pekin, and described it as having flowers of pale pink with yellow disk. He likewise procured many plants from Japan, Java, British Columbia, and elsewhere. Later in life he essayed farming, and settled at Godstone. His death, of bronchitis, after only a very few days' illness, was much mourned by all who knew him.—J. C. M.

The Trustees of the British Museum have just issued a second edition of the Guide, prepared by Dr. Rendle, to the exhibition illustrating the History of the Classification of Flowering Plants. In this exhibition, which is placed in the Botanical Gallery at South Kensington, an attempt is made to illustrate the evolution of the modern natural system of classification by means of books and portraits with explanatory labels. Starting with Dioscorides' *Materia Medica*, the history is traced through the old herbals to Morrison, Ray, and Linnæus; thence through the Jussieus, the De Candolles, and Robert Brown to the modern systems represented by Bentham & Hooker's *Genera Plantarum* and the recent modification of Eichler's system proposed by Professor Engler of Berlin. The price of the Guide, which can be bought only at the Museum, is 4*d*., by post 5*d*.

The completion of Dr. Drabble's account of the British Pansies, the first part of which was issued as a Supplement to the October number of the Journal, is held over until next month.

The Editor having, as announced in the September number, retired from his official connection with the Department of Botany, British Museum, is at present enjoying a holiday in Italy. It is hoped that his retirement may be the occasion of some communication of an autobiographical nature; such an account should be of much interest to botanists in general and readers of the Journal in particular. For some time past Mr. Britten has been engaged on the preparation of a Catalogue of the Sloane Herbarium; botanists will look forward to the completion of the work at no distant period.

The Editor regrets the late appearance of the present issue; the delay has been caused by his unexpected detention abroad.

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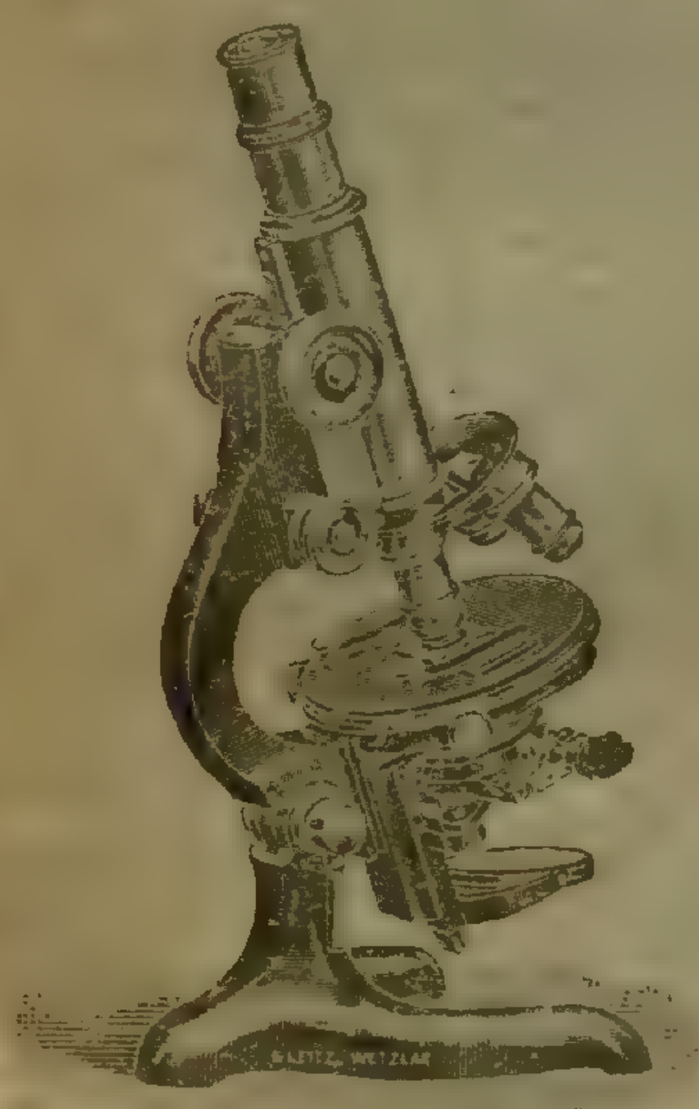

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Assisted by the Staff of the Cambridge Botany School.

Contents of July Number.—Recent Advances in the Study of Heredity. Lecture III.—The Mendelian Hypothesis, by A. D. DARBISHIRE. On a Cone of *Calomostachys Binneyana* (Carruthers) attached to a Leafy Shoot (Plate I. and Text-figs. 31, 32), by HAMSHAW THOMAS. The Development of the Spores of *Equisetum*, by RUDOLF BEER. Review: Dr. Paul Bertrand on the *Zygopterideæ*, by D. H. S.

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BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

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The Journal of Botany was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

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ABNORMAL FLOWERS IN *ERICA CINEREA* L.

By A. B. Rendle, D.Sc., F.R.S.

Early in October of the present year I received from near Axminster some branches of common heather (*Erica cinerea*), in which the flowers were replaced by small dark crimson shoots of about the same size as normal flowers. They were found by my sister "on the top of a very steep rough field just close to the moor which covers the top of Trinity Hill." One side or about half of a clump of heather was affected; the other side bore normal flowers, and the two sorts were not mixed. There was no sign of other clumps having been affected. The general effect was pleasing; the branches having the appearance of bearing dark crimson flowers. The foliage on the branches was normal. The red buds occupied exactly the position of the flowers, and were borne on normal flower-stalks; each consisted of a large number of short strongly ascending leaves closely arranged in superposed whorls of four; the four rows had often a strong spiral twist in the upper part of the bud. The phyllotaxy resembles therefore that of the flower, which is tetramerous, not of the foliage-leaves, which are arranged in whorls of three. The number of the leaves is, however, much greater than that of the parts of a typical flower, which, including three or four bracteoles, will not exceed twenty-four (four sepals, four petals, eight stamens, four carpels); the leaves in the buds in question numbered thirty-two or more. The lowest whorl resembled the bracteoles of a flower, the others were larger than bracteoles but smaller than the sepals of a normal flower, which they recalled in form and structure. They were about 2·5 mm. long (the sepals of flowers from the same clump exceeded 3 mm. in length), narrower than the sepals, especially in the lower portion; the margin was minutely ciliate—an indication of this is also found on the margin of the sepals for a short distance below the apex. Like the sepals, they were concave, with a blunt dorsal keel extending to a short distance above the base and marked by the thin median line representing the opening into the air space lined with thread-like hairs, which is formed by the curling back of the leaf-margins.

At the apex of the bud was a pistil hidden by the tips of the leaves immediately below it, but evident on dissection of the bud. This was formed of four carpels, and showed various stages of phyllody; the carpels were united below to form an ovary, in which two to four ovule-containing chambers were developed; above they were more or less coherent and more or less foliaceous; same portions bore stigmatic papillæ. For instance, one side of the pistil was perfect, having a style with a terminal stigma, while the other carpels were subfoliaceous, without stigmatic papillæ. One or more of the leaves immediately below and surrounding the ovary were flatter than the other leaves, and followed the contour of the ovary in their lower portion.

The question naturally arose as to whether the phenomenon

Shoot of Heather with abnormal flowers (natural size).
A. Flower much enlarged (× 14).

was the result of an injury by some external agent. There was, however, no sign of fungus, and Mr. C. O. Waterhouse, who kindly examined the specimens, found no trace of any animal organism; he pointed out, however, that the appearance was such as might result from the work of a *Phytoptus*, which in the ordinary course would have already deserted the buds. I have been unable to find any record of *Phytoptus* in connection with *Erica cinerea*. Examination of a series of microtome sections (for the preparation of which I have to thank Mr. R. H. Bunting) throws no light on the cause of this abnormal development. I am informed that not only has the locality of the clump of heather affected been carefully noted, but a portion has been removed to the garden, where it will be watched next season. Specimens have also been placed for reference in the British Museum Herbarium.

The Axminster specimens recall a teratological form of *Erica cinerea* described by Maxime Cornu in 1879 (in Bull. Soc. Bot. Fr. xxvi. 297), where the flowers were replaced by vegetative buds very similar in appearance to those on our specimen, but in which the phyllotaxy was that of the foliage-leaves, the leaves being in rows of six. M. Cornu also expressly states that the bud contained no trace of floral organs or of any damage by animal organisms. His suggestion that the sport, as he regarded it, was worth cultivating is also in conformity with the attractive appearance of our specimens.

These examples of replacement of flowers by decorative leaf-like buds are of a different character from the anandrous flowers which have been described in *Erica cinerea* and *E. Tetralix*. In 1872 Mr. Britten drew attention in this Journal (p. 47) to such specimens of *E. cinerea* sent from Wiltshire by the Marquis and also by the Marchioness of Bath, and preserved in the British Herbarium at the British Museum; those from the Marquis were among Sowerby's plants. Re-examination of these specimens shows no indication of stamens; the four petals are sepaloid, being free to the base, and resembling the four sepals in form, except that they are concave only in their upper portion, and somewhat ligulate in general shape. The pistil consists of an apparently normal ovary, which contains a large number of ovules, and a stout style which projects conspicuously from the top of the flower, and bears a large stigmatic surface. A similar form of *E. Tetralix* has been known in France since 1635, when it was referred to by Cornuti in his Enchiridion, and, as Mr. Britten points out, has been reported at intervals from the same locality—Montmorency (Seine-et-Oise).

SHUNNERS OF MAN.

By E. Adrian Woodruffe-Peacock, F.L.S.

When a flora is studied minutely, and exact notes are taken in the field as a permanent record of the facts observed, as on the rock-soil method, it at once becomes clear that plants can easily

be divided into various categories. One simple method of dividing them is to use their relation to man as the differentiating criterion. We then obtain :—(1) followers of man ; (2) indifferent to man ; (3) shunners of man.

It is not needful that I should print lists ; the field experience of all botanists will enable them at once to place the plants they know at all well in their right categories for their own districts. There is a difficulty, too, about printing lists without full details. So common a species as *Bellis perennis* L., which is indifferent to man on 90° per cent. of the soils of Lincolnshire, is a follower on the other 10° per cent. In the West of England I know localities where the percentages are almost exactly reversed.

What I want to demonstrate, with a few illustrations, is that shunners of man at times show the most unexpected and eccentric ways by appearing naturally in the crowded haunts of men ; and to draw the logical inference that follows.

Plants that are easily affected by buildings, smoke, drainage, sewage, cultivation, manuring, close cropping, &c., soon vacate the neighbourhood of man and his varied occupations in his daily round of work. For my purpose it is sufficient to say, water and bog plants, and the Filices generally, as an order, are good illustrations of shunners of man. A great number of exceptions to the usual rule in this respect could be named. I will, however, select three from my budget of notes on this subject, about which I believe there can be no mistake.

Phyllitis Scolopendrium Newm. is a decaying local-areal in Lincolnshire, if it be truly areal at all in this county, for at present I cannot say, as I have not yet studied it fully in all its known localities. In the past fifty years there are only fourteen records for it in eight out of the eighteen natural history divisions of this county. For division 3 it has only once been recorded. A plant suddenly appeared, about 1885, on the decaying top of a pollard willow in the village of Cadney. There was no plant in the place, either in garden or green-house, and the nearest villages are three miles off in a bee-line in various directions, but at the time it was not known to be grown in the open there. The nearest local-areal habitats, if they are such, are twenty miles on the west, and thirty on the east and south. The plant is now dead, and has left no successors, but there are leaves from it in the county herbarium.

It may be urged that this is an exceptional case. If so, what are we to make of my next illustration? The late Rev. Clennell Wilkinson, Rector of Toft-Newton, had lived many years in Pembrokeshire ; he had made a special study of the local Filices, and had a fine collection of his own gathering. In 1894 he said to me :—"Is *Ceterach* recorded for a native habitat in Lincolnshire yet?" "It is not," I replied, "and is not likely to be." "Go," he said, "to Sleaford, and on the north side of the chancel of the parish church, twenty feet from the ground, where a conductor-head has been stopped and has caused a wet spot, there is a plant of *Ceterach* growing. I should estimate it as three years old at

least. Where can the spores have come from to get there?" I saw it on the church on a future visit, and recorded the fact in *The Naturalist* for 1896, p. 327. The nearest local-areal habitat for the plant is unknown to me.

Now both these species are shunners of man, yet each could find a fitting nidus—one in a village, on the decaying head of a pollard willow, where it could obtain moisture and humus together; the other in the very heart of a small country town, twenty feet from the ground, on the only damp spot there was. I think, however, that my last case is still more difficult to explain, except in one way, for we are not dealing with a plant grown from wind-carried spores.

There is a rough, often very heavily over-eaten, pasture in my native parish, Bottesford, which I have known intimately and botanised in for forty years and more. It is rather boggy in parts, as it is old turf formed on Liassic Sandy Glacial Gravel superimposed on uneven Lower Lias Clay.

Pinguicula vulgaris L. was never seen there till 1890. Then only one plant was found. I myself saw it in flower in 1891. Since then nothing more has been seen of this species there. In any other field I could believe it might have been passed over, but not in that one. It was the next below the parish gravel pit where we—my brother and I—constantly shot rabbits. On the south of this field ran the beck; it thus became the favourite fishing ground of our youth. This field too, after 1874, was my best botanising ground, because it had the most beautiful and varied flora in the whole parish from its peculiar soil and moisture features. It made me the ecological student that I am. It was visited by snipe in autumn and winter, and not infrequently by wild duck. These birds rested too on the boggy moorlands, where this species grows more or less freely with us as a local-areal. As it was on a spot beloved by snipe, and where they bred at times, I hang to the theory, but it is only a theory, that one of these birds imported *P. vulgaris* on its feathers as a seed.

Why do I write so fully on these cases? Because they point an admirable moral. If we treated them as exceptional cases, as the parallel followers of man are too frequently treated, we should say co-relatively of each one: "It was sown by man."

In the cases given, and I could add others from my notes, it is practically demonstrable that they were not sown either purposely or by pure chance by man. We must fall back on the percentage of experience in such cases. Shunners of man are rarely sown by man, though of course there are plenty of palpable exceptions. There was no person living in Cadney at the time who took the least interest in ferns, or who had sufficient knowledge of them to plant one on a decaying pollard willow-head. Who, also, if he had carried *Ceterach* home from the West of England, would plant it on the one spot it could find a continual supply of sufficient moisture and not too much, twenty feet from the ground, when the source of the supply of the fluid might be stopped any day by the thoughtfulness of the parish sexton? Who would purposely

carry the seed of *Pinguicula* to the spot where it could flourish? I have studied the laws of environment for years, but I should not have selected the spot I saw it growing on as the one to choose in that field, had I not seen it flourishing there. Its nearest known habitats must be four miles away in a bee line in all directions. If the zephyrs and a bird sowed these plants, they are exceptional as shunners of man, from being sown naturally in the neighbourhood of man, but not from being sown by man, which is my point.

It may be urged in the case of the two ferns that the spores came by wind drift, but from plants which had been introduced into an unnatural geographical situation by man. That is a secondary matter, though one of importance. It is folly, however, to be misled by logic, by reason, into nonsense. The late Mrs. Brown, a good botanist, wife of the vicar of Cadney immediately before me, when she showed me the *Phyllitis* in my garden and told me its history, ended by saying:—"When it was growing on the willow in Parker's field the leaves had the usual fructification, but since we moved it into this garden it has had none." Neither had it any from the time I became vicar of Cadney till it died. Just so, for that was exactly what might have been expected. When it was naturally sown it developed normally; when it was moved to unnatural surroundings, where it could only just exist, its fertility was destroyed. A simple proof that in the first case the spore was naturally sown, that is wind-carried to a fitting environment.

GENTIANA GERMANICA AS A BRITISH PLANT.

By James Britten, F.L.S.

Mr. W. A. Clarke in his *First Records* (p. 97) gives 1841 as the earliest printed record for this species as British, with a reference to Gard. Chron. i. 671, where Coleman identified with it a plant collected near Tring by Pamplin some years previously. Subsequently, in *Flora Hertfordiensis*, p. 188, a plant seen in the same neighbourhood by James Dickson and William Anderson was similarly identified, though with some doubt; in the *Flora of Hertfordshire* (p. 274) Anderson's record is amplified from his MSS., and specimens gathered by Edward Forster* in a hilly wood near Tring in 1846, now in the National Herbarium, are also referred (as indeed they had been by Forster himself) to *G. germanica*. In this Journal for 1864 (pp. 65–68), Babington published a paper "On *Gentiana germanica* Willd.," with an excellent plate drawn from specimens collected at Buckland in Buckinghamshire, three miles north-west of Tring, by the Rev. H. Harpur-Crewe. In this paper he expresses some doubt as to previous records, not, I

* The date of his herbarium is given in the *Flora* as 1850, but Forster died in 1849.

think, recognizing that Mr. Harpur-Crewe's specimens came from the same neighbourhood.

During my recent investigation of Buddle's Herbarium in connection with the forthcoming Catalogue of the Sloane Herbarium (of which Buddle's plants form vols. 114–126) I have come across a plant (vol. 122, f. 20) which I had some years previously (and I think correctly) referred to *G. germanica*. This is labelled by Buddle (d. 1715) "Gentiana fugax Autumnalis elatior Centaurii minoris foliis R. Syn. 156. The taller Autumnal Gentian with Centaury-like leaves." The reference is here to the second edition of the *Synopsis*, from which the descriptive phrase is quoted; the plant, as Ray says (l. c.), had been mentioned by Doody in his appendix to the first edition (p. 245):—"D. Stonestreet Gentianellæ autumnalis speciem majorem vidit, sed ejus descriptionis oblitus est." The same descriptive phrase is associated with the St. Albans specimen from Rand's herbarium collected by Tilden (not "Fielden" as cited in the *Flora of Hertfordshire*) and by Petiver (d. 1718) with another specimen from the same locality also of Tilden's collecting (Petiver Hort. Sicc. Angl. iii. (=Herb. Sloane 152) f. 61). From this contemporary evidence it seems clear that the plant of which Ray's description has been quoted is identical with that which now appears in our floras as *G. germanica*, in which case its first printed record will date from R. Syn. ed. 1, 245 (1690), or perhaps more satisfactorily from ed. 2, 156 (1696), in which it is definitely named and localized:—"Found first by Dr. Eales near Welling in Hartfordshire; then by Mr. Dale, in some barren lanes at Belchamp S. Paul, Essex." Some doubt, however, attaches to the latter locality; there is in Herb. Sloane 145 f. 16 an unlocalized specimen with the Rayan name in Dale's hand attached which hardly corresponds with what is generally accepted as *germanica*, although it is large for *autumnalis*. It may indeed well be that a large state of this, as well as *germanica*, is covered by Ray's phrase, and that it is on this account that in the third edition of the *Synopsis* (p. 275) although the description is retained, Dillenius has added a note: "Eadem cum priore." This was also the view of Linnæus, who in *Flora Anglica* combines the two plants of the *Synopsis*. Of post-Linnean authors Willdenow was the first to separate them, establishing *G. germanica* in his Sp. Pl. i. 1346 (1797).

When I was visiting or living at High Wycombe in 1865–9, I had every opportunity of studying the two plants, which grew in profusion, though not always together, on many of the chalk downs—notably on Keep Hill and on Green Street, where *germanica* attained great size and beauty; when well grown it is I think one of our most beautiful plants. *G. Amarella* was the commoner, and in some places, as by the side of the road from West Wycombe to Bledlow Ridge and along the hillside between the Ridge and the Saunderton Union, I noticed this only. I see from some notes which I published on the Wycombe flora in the *Naturalist* for 1866–7 that I was then, with fresh plants at hand, unable to set down on paper any characters

by which to separate them, although they differed widely in general appearance, especially in the colour of the flowers, and I saw no forms which could be described as intermediate. (Nat. iii. 64.)

It is, however, I think certain, from contemporary evidence, that the plant described by Ray as "Gentiana fugax Autumnalis elatior," &c., included, if it were not entirely, the *G. germanica* of authors, and that the "first record" of this must therefore date from 1696, if not from 1690.

SHORT NOTES.

LENTINUS LEPIDEUS Fr. var. HIBERNICUS nov. var. — Pileus 2–2½ in. broad, firm and tough, depressed, often infundibuliform, of a greyish white colour; gills light yellow, irregular and sinuated in a remarkable manner, about 4 lines broad; pileus and stipes 2½–3 in. long, stipes solid, white inside, ½ in. thick near apex, tapering downwards to the thick dark-coloured rhizomorphous system. When I first saw this curious fungus in the hands of Mr. T. McCormick, an intelligent stoker at the Glasnevin Gardens, I was puzzled to know to what genus to refer it, until he showed me where it was growing on old wood in the dark corner of a coal-shed here. The thick rhizomorphous system adhered to pieces of the wood in the manner in which the rhizome of a *Davallia* clings to a pot or a block of wood. This rhizomorphous system is branched in a stag-horn-like manner, pushing forth also a few distant conical shoots of a greyish-white colour at the apex; on these were borne the pileus and stipes in various stages of development. Some of them were abnormal through pressure, &c., but these were very few, as careful examination of a series of specimens has shown; all hold the characters above given, and justify me in naming it as a very distinct variety of *L. lepideus*. It also bears considerable affinity to a well-marked species, *L. cochleatus* Fr., but none to the monstrous form of *L. lepideus* Fr. figured by Cooke in his *Illustrations of British Fungi*, plate 1141. I trust that the above description will enable the student to detect it again in this country in similar places. In Power's *Flora of Cork* (1844) *L. lepideus* is included; this is the only record of the type having been previously found in Ireland. One of its most remarkable characters is the thick mycelioid or rhizomorphous system which we found more than eight inches long; the branches sometimes terminate abruptly in an oval form: it measures about half an inch in thickness, and is covered with a dark brown coloured bark-like coat, formed from the mycelioid system. In all the material available I have found no spores, which in the type are oval and white.—DAVID MCARDLE.

HANTS AND ISLE OF WIGHT PLANTS.—*Leontodon nudicaulis* Soland. var. *pristis* Druce. To this must be referred a plant in Miss C. E. Palmer's herbarium gathered at Ventnor, Isle of

Wight, and cultivated in her garden in 1892, although the leaves are not quite so sharply and regularly cut as in my plant from Alderney and Guernsey described in this Journal, 1907, p. 423.—*Lithospermum officinale* L. var. *pseudo-latifolium* C. E. Salmon. The Hanger, Selborne, *C. E. Palmer*, 1890.—*Malva moschata* L. var. *Ramondiana* Gren. & Godr. = *integrifolia* Lej. & Court. The Lithe, Selborne, *C. E. Palmer*, Aug. 1882. Miss Palmer's herbarium is now in my possession.

Rosa Sherardi Davies.—Mr. F. J. Wiltshear in his interesting note (Journ. Bot. p. 353) says that "this name was allowed to lapse both by British and Continental authors until it was revived by the Rev. A. Ley in this Journal in 1907, p. 207." It will, however, be found in my *Flora of Berkshire*, p. 198, 1897, where I showed that it had precedence of Smith's *subglobosa*.

Crepis biennis L.—This, like its relation *C. taraxacifolia* Thuill. is an increasing colonist. It is a most conspicuous feature of the railway between Swindon and Badminton in Gloster and Wilts. I saw it as far west as Co. Clare in 1909.

Thymus præcox Opiz var. spathulatus Opiz (p. 384).—Only the Dorset locality belongs to the variety, the other localities are for *T. præcox*.

Rumex limosus Thuill.—By the fen dykes near Eye, Northamptonshire, Sept. 1909; new county record. In my *List* I marked this with a hybrid sign, following in this the plan adopted by Reichenbach (Ic. Fl. Germ. et Helv. xxiv. p. 43), in which it is said to be *conglomeratus* × *maritimus*, Haussknecht (in Mitt. Geogr. Ges. Thur. iii. 1885, p. 69), Beck (Fl. Nied. Oesterr. 319), and other authorities. The Rev. E. S. Marshall, however, doubts its being of hybrid origin. Ten or twelve years ago I saw *R. maritimus* near Peterborough, but no *limosus*; this year only *limosus* was noticed in that vicinity.—G. Claridge Druce.

Botanical Exchange Clubs.—As the Secretary of the Watson Botanical Exchange Club, may I say that the statement made by Mr. Jackson, on p. 432, that a member (misprinted "members") "sent in at least one hundred specimens of an orchid" is exaggerated and leaves a wrong impression. I have spoken to the member about it, and he informs me that he took eighty spikes out of fully two hundred that he saw growing, and that these he carefully cut off with scissors. It is regrettable that so many were taken, but according to Mr. Jackson's own statement little harm has been done. In a letter I have by me, dated April 27th, he says, "*Spiranthes æstivalis* ought not to have been collected in such quantity, though, as no roots were taken, little harm may have been done to the plants themselves, provided they were carefully cut and not pulled out of the sheaths." The spikes *were* cut, as the member states, and as is shown by the specimens on sheets I have seen. Mr. Jackson had the plants by him for several months, and could easily have ascertained these facts. Still it must not be thought that the Club in any way encourages the destruction of rare plants, or

extensive interference with them; on the contrary, their preservation is a matter of the greatest interest to us. It is stated at the head of the Desiderata List issued to members this year that the required number of sheets of any plant may be sent, "providing that there is no risk of destroying or appreciably diminishing a plant in any locality." With regard to the question of amalgamating the two Clubs, I may have some remarks to make later, and I hope that members will not in the meantime hurriedly come to a decision.—GEORGE GOODE.

"HEREDITY OF ACQUIRED CHARACTERS" (p. 354).—I certainly did "not explain" that in all the cases I instanced, excepting the two in the last paragraph of my note, mechanical means caused the change in the normal habits of the plants. All the same I thought it was clearly there till I saw the Editor's addition. I will, however, be perfectly explicit now. That in stock pastures the change developed is an acquired character I can prove from dozens of notes on some two dozen species taken on some thirty soils of the most varied nature. The explanation of an acquired character is good enough where the mechanical means are present in the form of stock, but not under other circumstances. In my last paragraph I instanced two species in totally unstocked seed pasture—*i.e.* the mechanical means were not present to influence a single specimen—as showing a percentage of the same "acquired characters," *i.e.* "the weeping" or "rosette" forms of *Geranium dissectum* and *G. molle* both are monocarps. I have "rosette" forms taken *by myself* from a seed pasture which was never stocked, for it was grown for clover-rye-grass hay. Now, if Miss Armitage or any one else can explain these forms by any means except by "heredity of acquired characters," I shall be greatly obliged. I have no particular wish to believe in it—I have an open mind—excepting the natural one, "that fact must have some rational explanation in an evolutionary world." If any sort of explanation can be given in this simple instance, I will set the readers of the Journal a much more difficult problem—a ten-year-old problem with me. A race of water plants living on dry clay, and flourishing abundantly, with no new external characters, but plenty of internal, physiological ones.—E. ADRIAN WOODRUFFE-PEACOCK.

ENGLISH NAMES OF PLANTS.—In your review of Mr. Praeger's excellent little *Tourist's Flora of the West of Ireland* (p. 281) you "regret that the author has been obsessed by the fetish which demands an 'English name' for every plant." As several popular books on botany have of recent years been published on the Continent, in which the coining of absurd or impossible English names of plants has been thought necessary, it may be well to draw attention to the subject. Let us take as an example of such a book the beautifully illustrated *La Flore Alpine*, by H. Correvon and Philippe Robert, published this year at Geneva. Many of the coloured plates are extremely beautiful, but they are not improved by the addition of impossible English names. My friend M. Correvon tells me he submitted the names to an English

botanist, and yet we find: Heterophile Pansy, Pansy of the Mont Cenis, Superb Pink, Rivulet Cranesbill (*G. rivulare*), Dodonœus's French Willow (*Epilobium Dodonæi* = *E. Fleischeri*), Fœtid Aposerid (*Asposeris fœtida*), Alpine Balsam (*Erinus alpinus*), Scutate Dock (*Rumex scutatus*), and such combinations as Beards' Eye Primrose, and Field's Oxytropis (*O. campestre*). It is bad enough to read of "Bristle-leaved Spike Rush" in an English book, but why do some *Continental* botanists think it necessary to put an English name to every plant, and even to those which never occur in Britain?—H. S. Thompson.

Aplozia riparia var. potamophila in Yorkshire.—About two years ago I collected an *Aplozia* in a mountain stream, and referred it to *A. cordifolia*. On subsequent investigation I was dissatisfied with this naming, and decided to call it a form of *A. riparia*. As several hepaticologists were doubtful about the plant, it was sent to Messrs. Macvicar and Nicholson, and they agree in naming it *A. riparia* (Tayl.) Dum. var. *potamophila* Bernet. It is found abundantly in a mountain stream, at a height of about 900 ft., in Greenfield, Yorks, v.-c. 63, and is associated with *Chiloscyphus pallescens*, *Pellia epiphylla*, *Scapania undulata* and its var. *purpurascens*, *Hypnum falcatum*, *H. commutatum*, *Bryum pseudotriquetrum*, *Philonotis fontana*, *Eurynchium rusciforme*, *Dicranella squarrosa*, *D. Schreberi*, and *Mnium punctatum*. It is found in other upland streams of the district, but I have never found it growing with the type, though the latter is not rare. It is a larger plant than any specimens of the variety I have hitherto seen, and has a great resemblance to *A. cordifolia*. Up to the present, as far as I am aware, this variety has only been recorded from Scotland and the Isle of Man, though its range will probably be considerably extended when its characters become better known.—W. Watson.

Fumaria occidentalis Pugsley.—In my recent paper (p. 413) I have stated with reference to the above plant, "Found by Mr. H. W. Pugsley at Penzance and elsewhere in Cornwall in 1902," which facts seemed to me to be naturally inferred from Mr. Pugsley's paper in this Journal for 1904. I have since, however, been informed by my friend Dr. C. C. Vigurs that this is an imperfect and misleading statement of the case, for he had himself observed the plant at Newquay as far back as 1898 and had called the attention of Mr. Hume to it, and they both agreed that it did not answer to the description of any then known species. Dr. Vigurs then made several attempts to get the plant named by some specialist, but unfortunately without success. It seems to me important that these facts, of which there is no hint in Mr. Pugsley's paper, should be recorded, so that Dr. Vigurs should have due credit for a very interesting discovery.—W. A. Clarke.

Gyrophora spodochroa Ach.—In reference to our note (p. 431) with regard to the first discovery of this lichen in Britain, we now find that Mr. J. A. Martindale recorded it, with a full

description of the plant, in *The Westmorland Note Book and Natural History Record* in 1889. Mr. Martindale tells us that this periodical was an account of the Proceedings of the Kendal Natural History Society. It had only a local and limited circulation, and the publisher after the second year refused to continue its publication.—J. A. Wheldon and A. Wilson.

REVIEWS.

The Book of Nature Study. Edited by J. Bretland Farmer, &c., assisted by a Staff of Specialists. Vol. v. pp. viii. 224. Caxton Publishing Co. 7*s.* 6*d.* (per vol.).

The fifth volume of this very useful work, which has, we hear, met with a most favourable reception from the public, differs considerably from those which preceded it. It is devoted entirely to Botany, which it treats principally from the practical side.

Beginning with theoretical chapters on Xerophyte and Aquatic Vegetation, followed by others on that of Meadows and Pastures, and on the Weeds of Cultivation, we are led on to others dealing with the establishment and maintenance of a School Garden, the importance and advantages of which are insisted on, very business-like instructions being furnished as to selection of soil, preliminary operations, tillage, including manuring, multiplication of plants, vegetable, fruit, and flower culture, insect and fungoid enemies to be guarded against; with a final chapter on the Origin of Soils.

It will easily be understood that such a volume is better suited for purposes of practical instruction and utility than for those of the ordinary reviewer. It must suffice to say that the information furnished appears to be both detailed and trustworthy, and should prove a real boon to inexperienced persons, for whom it is, of course, chiefly intended.

Of the illustrations, four plates are in colour, about two dozen are photographic reproductions; the remainder—seventy-seven in number—are outline drawings of plants or their organs, diagrams and plans. These are exceedingly good, and eminently suited for the purpose which they are meant to serve. Of the coloured plates, one, the frontispiece, representing some climbing hedge-row plants—Woody Nightshade, Clematis, Honeysuckle, and Blackberry—seems liable to the objection, urged in previous cases, that, however pretty as a picture, it does not give a good idea of the plants as they are actually found in nature. In the three remaining instances, the coloured plates exhibit landscape views rather than illustrations, in which individual flowers can with difficulty be recognized—as "A Meadow," "An Old Garden, "A Rock Garden." From the first of these especially it is hard to see what is to be learnt: a broad expanse of yellow-green is diversified by various patches, which, as we are told in the margin, represent, besides oak and elm trees, sorrel, buttercups, daisies, and clover. Much the same holds true of several of the photographic plates, which deal with their subject on a scale too large

to be really and specifically instructivē. There is one illustration (p. 74) representing a hedgerow in spring; we are informed that certain white flowers diversifying its heart are those of Garlic Mustard, but they might almost as well represent many other plants. The connection of several of these plates with practical botany is, indeed, not very close, as, for instance, that (p. 128) representing "Boys and Girls aged eleven to thirteen at work on Herbaceous and Rose Borders, June."

J. G.

Die Würzelpilze der Orchideen, ihre Kulter und ihr Leben in der Pflanze. Von Dr. Hans Burgeff. 8vo, pp. iv. 220, 3 pls. and 38 text figs. Fischer, Jena. Price, 6.50 marks.

Much work remains to be done on the subject of fungus symbiosis in relation to the higher plants. One of the most interesting chapters in this study is the association between fungi and the roots of Orchids, of which Dr. Burgeff gives some account in the small volume now before us. The subject has already been carefully studied in recent years by Noel Bernard, who has isolated several forms of fungus from different species of Orchids, and by growing them in association with sterilized seeds of the same species has synthesized the symbiotic organisms. Bernard placed the orchid fungi in the genus *Rhizoctonia*, from their resemblance to *Rhizoctonia Solani*. Dr. Burgeff, who has carefully examined fifteen different orchid fungi, does not venture an opinion as to whether they represent so many species or are mere growth forms, as no trace of sexual fructifications was found; he prefers to give them a group name with no systematic significance, namely, *Orcheomyces*. Dr. Burgeff describes in detail the various forms which he names according to the species-name of the Orchid from which they were isolated, such as *Orcheomyces musciferæ* from *Ophrys muscifera*, *O. labiatæ* from *Cattleya labiata*, &c. The various forms are then arranged in four groups according to the character and mode of growth of the hyphæ and spores.

An account of the nutrition of the fungi is given in some detail. Carbohydrates are taken up in the form of simple or higher sugars. Assimilation of free nitrogen does not apparently occur, as the fungi do not succeed on a substratum which contains no nitrogenous constituent. Atmospheric oxygen is necessary for their development; they are not anäerobic.

In the second part of his work Dr. Burgeff gives an exhaustive account of the relation between the fungus and the orchid in the large number of cases which he has studied. He describes first the structure of the seed, its infection through the suspensorial cells, and the development of the fungus from this point of infection throughout the germ tubercle; and then discusses the phenomenon in the fully developed plant.

The book is well illustrated and clearly printed on a highly glazed paper, which will look very nice so long as the surface lasts. It forms a useful contribution to the study of these interesting relationships between the fungi and the higher plants.

A. B. R.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on Nov. 4, Prof. H. H. W. Pearson gave a lecture, illustrated by lantern-slides, entitled: "Types of the Vegetation of Bushmanland, Namaqualand, Damaraland, and South Angola," of which the following is an abstract:—The Floras of the regions named in the title are very distinctly related, if the remarkable vegetation found on the Huilla plateau in South Angola be excluded. Otherwise the differences that are observed are probably to be accounted for mainly as a result of differences of (1) elevation; (2) atmospheric humidity; (3) depth at which permanent supplies of underground water are available; (4) geographical position, especially with regard to the composition of the floras of contiguous regions. In all, the rainfall is normally scanty and inconstant, and there is a prolonged drought in the winter season. Near the coast, in some places up to elevations as great as 2700 ft., the total annual rainfall is never more than a few millimetres and frequently fails altogether. The affinities of these floras (again excepting that of the Huilla plateau) are primarily with those of the South Central African highlands. In South Angola many species are undoubtedly derived from the coast and montane regions of West Tropical Africa. Throughout, the vegetation is more or less extremely xerophytic in character, and is marked either by a very short period of duration or by the possession of those structural peculiarities which are commonly found in dry climate perennials. Of these, hairiness is, in general, not a conspicuous feature: except in Lower Namaqualand, succulence is not especially common. A round bushy habit is very marked throughout. The root system is usually very deep; the leaves are commonly simple and of small size and with a strongly developed cuticle. The formations and associations indicated are predominant by reason either of their great extent or of striking peculiarities of the plants composing them. They are arranged in the main geographically from south to north.

We have received the "Proposition d'une Amplification de la Liste de Noms génériques de Phanérogames qui doivent être conservés en tout cas," which Dr. Janchen will submit for adoption to the Botanical Congress next year. Dr. Janchen prefaces his list with the following note: "Cette amplification de la liste d'exceptions ne s'applique pas aux noms que l'on a omis intentionellement en 1905, mais seulement à ceux qui furent oubliés par inadvertance ou par suite de connaissance insuffisante de la littérature relative. Ainsi donc, l'amplification susdite ne veut pas introduire une innovation mais conserver l'existant et le mettre en sûreté pour l'avenir." He illustrates the "necessity" for such amplification by examples of names which should have been, but were not, included in the list adopted at Vienna, and continues: "La non-exécution de l'amplification proposée aurait pour résultat qu'une partie des botanistes adopteraient les noms inusités ayants droits de priorité,

tandis qu'une autre partie des botanistes conserveraient, en se référant à l'article 5, les noms usuels maintenant, mais n'ayants pas droits de priorité. Par là, la conformité de la nomenclature serait gravement préjudicée et la valeur entière de la liste d'exceptions serait rendue illusive. On ne peut remédier à ces inconvenients, respectivement les prévenir qu'en acceptant une amplification de la liste d'exceptions." We trust that Dr. Janchen's proposition will not be accepted. The adoption, without due consideration or discussion, of the list brought forward at Vienna was, as we have always maintained, a regrettable incident, and, although we think it should be accepted, we are not surprised that some take a different view. But the frequent addition of "nomina rejicienda" to the list can only add to confusion and is unfair to those who conscientiously endeavour to observe priority in nomenclature.

The Rev. W. Hunt Painter has presented the whole of his botanical, geological, and conchological collections to the University College of Wales, Aberystwyth. Mr. Painter's herbarium is of especial interest. It includes a practically complete collection of British flowering-plants and ferns, together with many European and other specimens. There is also a fine collection of Cardiganshire and other mosses, accompanied by a considerable number of microscope slides of leaves, capsules, &c.

The *Irish Naturalist* for November contains an account of John Henry Davies, of Lenaderg House, Co. Down, who died at Belfast on Aug. 20, from which we take the following particulars. He was born at Warrington, Cheshire, in 1838; in early life, while residing at Ballitore, Co. Kildare, he developed a taste for botany, and gained a good knowledge of the plants included in the Irish flora, making from the first a speciality of mosses, and corresponding amongst others with Professor W. H. Harvey, of Trinity College, Dublin, and William Wilson, of Warrington; specimens of mosses collected by him in Wicklow and Kildare in 1857 appear in the Herbarium of Trinity College. In 1856, during a short visit to the Isle of Man, Davies compiled a list of all the mosses that he could find on the island, which was subsequently published in the *Phytologist* for 1857, and was his first published contribution to science. He joined the Belfast Naturalists' Field Club in 1871, and took an active part in the work of the Society. During his residence of half a century at Glenmore in Antrim, and Lenaderg in Down, Davies's botanical work was confined almost exclusively to mosses, of which he was successful in discovering one species new to the British Islands, and several new to Ireland. These are for the most part recorded in the *Irish Naturalist*, 1900–1907.

The Report for 1908 of the Botanical Exchange Club, by the editor and distributor Mr. W. Bell, has been issued by Messrs. James Parker & Son, Oxford, price 2*s*. 6*d*. We hope to give some extracts at an early date; meanwhile we may call attention to the

note at the end, in which Mr. Druce suggests an extension of the Club. He says:—

"It appears to me that in some ways the Club might be made more useful if its bounds were widened and its activities extended so as to make it a Society of Field Botanists as well as an Exchange Club. The proposed Society might be organised on the plan of the old Botanic Society of London, which did such excellent work for many years. There can be little doubt that Systematic Botany in this country is, in certain directions, languishing through the want of some central organization. At present, many really good botanists hesitate to join us, some because they think it wrong to collect large quantities of specimens, and others because they think exchange clubs lead to the extirpation of rare plants. These are, to a large degree, mistaken views, but they obtain; and the inclusion of certain very rare plants in some lists of desiderata undoubtedly tends to foster such views. It is highly probable that many of the botanists in question would join a Society whose activities were many-sided, even though they cannot be persuaded to join an Exchange Club. With an enlarged membership, British systematists would be kept more *in touch* with each other, and would be able to illustrate more fully and to describe in greater detail the results of their labours in the field. Critical plants would be more widely studied, and botanists only partially interested in the subject would be made keener. Comparative culture of critical forms would be stimulated; and, in view of much recent work in plant-breeding and the establishment of experimental gardens, it seems probable that at last this much-needed work will be taken up in this country. Academic systematists would doubtless be pleased to join the new organization, and to contribute to a knowledge of the ecology, physiology, structure and development of critical genera. Such work is now being done, and field-botanists would profit by being in touch with such workers."

There is undoubtedly much to be said for such a scheme, but care would have to be taken not to interfere with the work of local societies, some of which are already doing good work in the directions indicated.

The Trustees of the British Museum have issued a new and revised edition, prepared by Dr. Rendle, of the *Instructions for Collectors of Plants*. The section on Algæ has been rewritten with the help of Mr. and Mrs. Gepp, and those dealing with the preparation of Fungi and Lichens with the help of Miss A. Lorrain Smith. The pamphlet may be obtained at the Natural History Museum, Cromwell Road, price threepence, by post threepence-halfpenny.

Miss Jessie Jane Clarke has been appointed an Assistant in the Kew Herbarium.

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CORRIGENDA.

P. 72 l. 6 from bottom, for "*New*" read "*Seed*".
Pp. 172–177. The Taw Valley localities for *Rubi* under Vice-county 3 should be assigned to Vice-county 4: see note on p. 355.
P. 203, top line, for "*Sagina*" read "*Stellaria*": on this and following page under "Y," where "Barlow" occurs, substitute "Baslow."
P. 279, l. 27 from bottom, for "with *Hippophæ*" read "with *Hippophae*."
P. 422, l. 2 from bottom (not elsewhere), for "Huayaguil" read "Hauyaquil"; l. 12 from bottom, for "Lasigne" read "Lasègue."

1. Viola Deseglisei Jordan. 2. V. obtusifolia Jordan. 3. V. agrestis Jordan.
4. V. ruralis Jordan. 5. V. segetalis Jordan.

West, Newman proc.

1. VIOLA DERELICTA Jordan.
2. VIOLA SUBTILIS Jordan.

THE BRITISH PANSIES.

BY

E. DRABBLE, D.Sc., F.L.S.

THE British Pansies have been much neglected by systematists. It has been recognized that several distinct plants are included under the names *V. tricolor* L. and *V. arvensis* Murray, but no very vigorous attempt has been made to clear up the whole matter. And, indeed, the problem is one of very considerable difficulty, not so much on account of the "critical" nature of the species, for they are very well characterized, but because the naming of specimens by various botanists on the Continent has been extremely inconsistent. As the result of this, several different plants have been sent out under one name, and some of these plants have appeared again and again under different names. This renders the problem more than usually involved.

It is only after a long and very detailed examination and comparison of original descriptions and authentic specimens that the following account has been written, in response to the request of many botanists for a working description of our British Pansies. The first two chapters aim at presenting the various species in such a manner that plants gathered in the field may be referred to their correct position and named. A full account of the historical and nomenclatural side of the subject, as well as a summary of the distribution of these plants in Britain, will follow.

CHAPTER I.

In this chapter only the Pansies comprised in *V. tricolor* L. and *V. arvensis* Murray will be dealt with; the *Curtisii* and *lutea* sections will be treated later.

The plants under immediate consideration fall into the two groups *arvensis* and *saxatilis* in Rouy & Foucaud's *Flore de France*. I shall here make three groups—I. ARVENSES; II. TRICOLORES; and III. SAXATILES.

I. ARVENSES.

Plants of cultivated soil, annual in duration, with a simple descending root, and without underground perennating branches. Flowers small, pale coloured, with corolla normally shorter than or equalling the sepals.

1. Viola agrestis

Jordan, Observations, ii. p. 15, t. 2 A; Boreau, Fl. du Centre, ed. 3, ii. 81.

Stems usually branched from the base, but with a principal stem; *stems somewhat flexuose*, more rarely with few branches, upright; from 9 to 12 in. in height, *pubescent or hairy*. *Leaves pubescent*, often dark green, crenate, ciliate. Lowest cauline leaves oval-obtuse, intermediate *lanceolate acute attenuate* at both ends, *uppermost narrowly lanceolate acuminate*. Stipules pubescent, ciliate; lateral lobes linear-oblong-lanceolate, arising at or near the base of the stipule; *median lobe large foliaceous crenate*. Sepals broad, oblong-lanceolate, shortly acuminate ciliate and often pubescent, with large appendages. Petals shorter than the sepals or equalling them, the two uppermost broad, white, or tinged with blue, occasionally entirely blue; the lateral and lowest white or pale yellowish white, with 5–7 violet striæ; umbilicus yellow. Spur of the lowest petal shorter than the sepaline appendages. Tab. 500, f. 3.

A plant of cultivated or broken waste land. The downy or hairy character is very pronounced, and sometimes gives quite an ashy appearance to the whole plant. Our British specimens match Jordan's figure perfectly.

2. Viola segetalis

Jordan, Observations, ii. p. 12, t. 1 B. Exsicc. Schultz, Herb. Norm. Cent. 5, n. 433 (!), and nov. ser. Cent. 11, n. 1033 (!).

Stem *simple or branched near the base, branches long, straight, nearly erect, glabrous or slightly pubescent*, 10–18 in. in height. Leaves pale green, *glabrous or slightly pubescent*, always with ciliate margins, openly crenate or crenate-serrate. Lower and intermediate cauline *leaves lanceolate acute, narrowed and lengthened at both ends, uppermost linear lanceolate*. Stipules with narrow, linear, lateral lobes arising near the base, *middle lobe entire, linear-lanceolate* (in stipules of the lower leaves occasionally with a few teeth, but those of the intermediate and upper leaves always entire). Peduncles long, ascending. Sepals lanceolate (never linear) acuminate, more or less ciliate, the ciliation occasionally taking the form of an exceedingly fine toothing of the sepals. Sepaline appendages large and oblong. Petals usually shorter than the sepals, sometimes equalling them, uppermost petals white, or with a slight violet suffusion, the lateral and lowest petals white, the lowest usually narrower than in *V. agrestis*, and with or without five violet striæ, yellow in the umbilicus. Spur of lowest petal not longer than the sepaline appendages. Tab. 500, f. 5.

A plant of cultivated soil, particularly cornfields. It is readily distinguished from *agrestis* by its usually taller, more upright habit, the entire middle lobes of the stipules, and the narrower and paler green leaves. The ciliation of the sepals varies considerably. Cheshire examples show an abundant ciliation, while other plants

collected in Cornwall are only scantily ciliate. The ciliation may pass into very minute dentation.

3. Viola subtilis

Jordan ap. Billot, Annot. Fl. France et Allem. 101 (nomen). Exsicc. Billot, Fl. Gall. et Germ. n. 2020 (!); C. Magnier, Fl. Select. Exsicc. n. 3048 (!).

Stem 6–12 in. in height, simple or branched from the base into two or more upright axes, slightly pubescent, straight. Lowermost leaves ovate or lanceolate, crenate, *intermediate leaves linear-lanceolate*, incise-dentate-crenate, pubescent, ciliate, acute, much narrowed into the petiole. *Uppermost leaves linear*, dentate-crenate. Stipules pubescent, ciliate, *middle lobe of lower stipules* linear-lanceolate, generally *somewhat dentate*, *lateral lobes* linear acute, *arising successively for some distance up the stipule*. *Stipules of intermediate leaves with linear dentate or subentire middle lobe, of uppermost leaves with narrowly linear entire or slightly dentate middle lobe*, and subsetaceous lateral lobes. Peduncles long, upright in flower, slightly spreading in fruit. Sepals narrow acuminate, ciliate (sometimes very sparsely so). Sepaline appendages oblong or oblique. Petals not longer than the sepals, usually entirely white, occasionally with a little purple in the upper petals, and the yellow umbilicus is often wanting. Spur a little exceeding the sepaline appendages or merely equalling them Tab. 501, f. 2.

This plant is not very common in Great Britain. It occurs in cultivated fields and waste places, and is of lower growth than *V. segetalis*, from which it may be distinguished by its smaller size, and very narrow generally toothed middle lobe of the stipule.

This plant was apparently originally confused by Jordan with *segetalis*, since some of his plants sent out under this latter name fall under *subtilis*. This point will be discussed below.

4. Viola Deseglisei

Jordan in Boreau, Fl. du Centre, ed. 3, ii. 82.

Plant 6–10 in. in height, *branched from the base*, the lateral branches *spreading below* and then *ascending* or erect, straight. Leaves crenulate to crenate-dentate ciliate, slightly pubescent. The lower *leaves* oval obtuse, those *of the middle of the stem lanceolate obtuse*, narrowed into the petiole, the uppermost narrowly lanceolate acute, intermediate and upper *leaves very deeply crenate-dentate, with forwardly directed somewhat irregular teeth. Stipule with linear lateral lobes arising successively for some distance up the stipule, middle lobe narrowly lanceolate, with few crenulations* or subentire. Peduncles upright in flower, slightly spreading in fruit. *Calyx* dark green, *generally deep violet below*. *Sepals broad* lanceolate acute, pubescent, or subglabrous, ciliate. *Sepaline appendages* oblong, *often violet*. Corolla about equalling the calyx, petals yellowish white, the upper petals often suffused with violet, the lowest petal with violet lines. *Spur deep violet*, shorter than or very slightly surpassing the sepaline appendages. Tab. 500, f. 1.

The distinctive characters of this plant are very difficult to express on paper, but they are very obvious in the actual plant whether fresh or dried. The leaves are thinner than in *agrestis*, and of a drier texture, sometimes almost subcoriaceous. The crenulations are very deep, and form irregular forwardly directed blunt teeth. The subaerial portion in well-grown plants is branched into a number of subequal stems from the base, there being often no very clear distinction between main and lateral stems. The purple-green tint of the sepals and their appendages is also very characteristic.

A specimen thus named, collected by Boreau, "Alloins Cher. 6/54," ex herb. H. C. Watson in the Manchester Museum, agrees exactly with our plant in habit and crenulation of leaves.

5. Viola obtusifolia

Jordan, Pugillus, p. 23.

Stems many pubescent ascending from the base, but with one principal stem, or single erect. *Leaves* ciliate, often sparsely pubescent, crenate, *very obtuse*, the uppermost alone sometimes subacute, never acuminate. *Stipules* with linear *lateral lobes arising close to the base, middle lobe large obtuse foliaceous, crenate.* Peduncles ascending. Sepals broad, oblong-lanceolate, ciliate, with large oblong appendages. Petals shorter than the sepals, rarely equalling them, or even longer. Upper petals white or tinged with violet, lateral and lowest usually quite white or with violet striæ and yellow umbilicus. Spur of lowest petal not longer than the sepaline appendages. Tab. 500, f. 2.

A plant of cultivated and waste land, generally in cornfields. It is readily distinguished from *V. agrestis* by the pale green colour of its leaves and their very obtuse apices, the uppermost alone being sometimes subacute. The foliaceous middle lobes of the stipules at once distinguish it from *V. segetalis*.

6. Viola ruralis

Jordan in Boreau, Fl. du Centre, ed. 3, ii. 81. Exsicc. Billot, Fl. Gall. et Germ. n. 3526 (*l*).

Plant 6–10 in. in height, covered with a fine pubescence. Stem branched from the base, branches ascending or upright, straight. Leaves crenate, lower leaves ovate obtuse, the upper leaves ovate or ovate-lanceolate, ciliate, somewhat pubescent. Stipules ciliate, broad, with *broadly linear-oblong lateral segments* arising near the base and successively for some distance up the stipule, and directed forwards, giving with the middle lobe a *palmately pinnate* form to the *stipule* as a whole; middle lobe broad, usually with a wide base, crenate. Peduncles nearly vertical in flower, spreading slightly in fruit. Sepals lanceolate acute, pubescent, ciliate, with broad oblong appendages. Petals as long as or a little longer than the sepals, yellowish white, sometimes with a violet suffusion in the two uppermost, the lowest often with violet striæ. Spur

not longer than the sepaline appendages, sometimes purplish. Tab. 500, f. 4.

Var. *glabra* (nov. var.). Sepals glabrous, non ciliate.

A plant of cultivated soils, cornfields, turnip and potato fields, &c. It is very readily distinguished from *obtusifolia* by its stipules. In *ruralis* the lateral lobes arise successively one above another for a long distance up the stipule. These lateral lobes are generally rather broadly linear oblong obtuse, and the middle lobe is not nearly so leaf-like as in *agrestis* and *obtusifolia*. *V. ruralis* is, in fact, one of the best marked of the *Arvensis* section. I am here following Rouy & Foucaud in accepting Billot, Fl. Gall. et Germ. no. 3526, as this plant. *V. ruralis* was described in Boreau's *Flore du Centre*, ed. iii., and appended to his description is the note, "Confondue souvent avec l'*agrestis*." An examination of specimens named *agrestis* by Jordan himself has led to the conclusion that at one time, at all events, Jordan confounded *ruralis* with *agrestis*, for some plants named *agrestis* by him do not agree at all with his figure (Obs. ii. t. 2 A), nor with his description. Formerly I termed the *agrestis* of Jordan's figure and description "*agrestis* α," while the distinct plant just referred to I called "*agrestis* β." This provisional naming, however, clearly cannot stand, and it became necessary to find another name for "*agrestis* β." Obviously this involves a denial of the name *agrestis* to certain plants sent out by Jordan himself, and such a necessity caused great hesitation, but the fact is undeniable that Jordan's figure and description refer to one well characterized plant, while the specimens just referred to are totally different. The next fact to be mentioned is that this plant "*agrestis* β" was found to agree with *Viola ruralis* Jord. in Billot's Fl. Gall. et Germ. no. 3526. The plants issued under this number were obtained from Mr. J. G. Baker at Thirsk. Mr. J. G. Baker has examined the plant with me, and says that it may be accepted without hesitation as *V. ruralis* Jord. As this somewhat curious position may appear rather unsatisfactory, I may here mention that Billot, no. 3526, and our own Pansy termed by me *V. ruralis*, will probably prove to agree with *V. gracilescens* Jord. described in Observations ii., and there figured. In this case the name *gracilescens* will replace *ruralis*. This matter will be treated at length below.

7. Viola arvatica

Jordan, Pugillus, p. 24.

Plant generally small, about 5 in. in height, but when growing amongst corn sometimes reaching a foot or more in length, the stem becoming lax with long slender internodes. *Stem* pubescent or subglabrous, normally rather rigid, *strongly flexuose zigzag*. *Leaves small*, more or less ciliate, and generally with a scanty short pubescence, lower ones ovate, intermediate ones narrowly ovate, acute or subacute, upper leaves lanceolate acute. Stipules more or less ciliate, lateral lobes narrow linear, and arising successively up the stipule, giving a pinnate character to this organ; middle lobe

larger, subfoliaceous, entire, or with a few crenulations. *Peduncles very widely divaricate.* Sepals rather narrowly lanceolate acute, more or less ciliate, appendages short oblong. Petals not at all or only very slightly exceeding the calyx, generally pale, occasionally with a violet tinge, spur short, not longer than the sepaline appendages.

This plant is readily distinguished by its small size, its usually very small corollas, its very flexuose stem, and widely divaricate peduncles. When small it approaches most nearly to *V. derelicta*, and when large to *V. agrestis*, but the above-mentioned characters serve to distinguish it from both.

8. Viola derelicta

Jordan, ap. Billot, Annot. Fl. France et Allem. 101 (nomen).
Exsicc. Billot, Fl. Gall. et Germ. n. 2022 (!).

Usually a very small plant. Stem single, 4–12 in. in height, *very straight and slender, unbranched*, or at most rarely very slightly branched, glabrous, or very slightly pubescent. Internodes long. *Leaves small, pale green*, lower leaves ovate-rotund crenate, very obtuse with subcordate base, intermediate leaves oval-elliptic-oblong, obtuse, crenate round based. Uppermost leaves ovate-lanceolate or lanceolate, subacute or acute ciliate. *Stipules* ciliate, those *of the lower leaves very small*, with few short linear acute lateral lobes and a linear middle lobe slightly broadened upwards, obtuse. Stipules of upper leaves larger, lateral lobes about six, linear acute, middle lobe broader, elliptical, subacute, with 1–2 crenations. *Peduncles very long, very slender, vertical* when in flower, slightly divaricate in fruit. Sepals pale green, narrowly linear-lanceolate acute ciliate, with oblong appendages. *Corolla very small*, usually much shorter than the sepals (occasionally rather longer). Spur shorter than the calycine appendages. Upper petals white or with some suffusion of blue, the rest white, lowest with slight purple striæ, and yellow umbilicus. Tab. 501, f. 1.

The smallest of our Pansies of the *Arvensis* section. The very small flowers, pale green leaves, and simple, straight, upright stem render the recognition of this plant an easy matter.

V. obtusifolia and *V. agrestis*, when flowering in a very young condition, may be mistaken for *V. derelicta*, unless care be taken to give attention both to young and better grown plants. I am nearly convinced that *V. derelicta* is synonymous with *V. pallescens* Jordan (Observations, ii.), for reasons to be stated below. If so, the name *pallescens* must be adopted for this plant.

II. TRICOLORES.

Plants of cultivated land, with large flowers and annual or perhaps occasionally biennial habit, but without underground perennating branches. Spur not at all or only slightly exceeding the large sepaline appendages.

9. Viola Lloydii

Jordan in Boreau, Fl. du Centre, ed. 3. ii. p. 80. Exsicc. Soc. Dauph. n. 2777 (!).

Stem 6–18 in. in height, *with ascending branches* spreading at the base. Stems pubescent, often very sparsely so. *Leaves ciliate*, slightly hispidulous, lowest oval or subcordate crenulate obtuse, the others *oblong-lanceolate obtuse crenate*. Stipules ciliate, with broadly linear-oblong *lateral lobes arising principally near the base*, *the middle lobe lanceolate-oblong*, *slightly crenate or entire*. Peduncles upright in flower, spreading somewhat in fruit, *bracteoles whitish*, *below the curvature*. *Flowers large*, *sepals broad* lanceolate acuminate ciliate, *with a very narrow scarious margin*. Sepaline *appendages* dentate, *broad*. *Corolla a little longer than the sepals*. *Petals broad*, *the upper ones overlapping*, *violet*, paler at the base, *the lateral ones pale* or white striated with purple, the lowest broad and truncate, white or yellow with purple striæ. Sometimes the flower is entirely purple or blue, or rarely entirely yellow. Spur not longer than the sepaline appendages.

This plant is readily recognized by its showy flowers, its long leaves (occasionally shorter and broader, especially in cultivation), and the form of its stipules as described above. It is fairly abundant, but rather local, in cultivated fields.

Var. *insignis* (nov. var.). *Petals very large* and for the most part deep purple, much longer than the sepals. *Sepals less strongly ciliate* or almost non-ciliate, *broad*. This seems to be a perfectly constant variety, and I have hesitated before refusing it specific rank. It retains its characters unchanged in cultivation.

10. Viola variata

Jordan, Pugillus, p. 26.

Stems slightly hairy or shortly hispid, branched from the base, *branches spreading* and finally ascending; occasionally the stem is simple, erect, unbranched. Leaves more or less hairy, or shortly hispid, ciliate (cilia sometimes obsolete in the older leaves). *Lower leaves long-petioled*, subcordate-rotund, very obtuse, crenulate. Intermediate *leaves ovate obtuse or subacute*, *uppermost leaves ovate or ovate-lanceolate acute*. *Stipules broad*, *lateral lobes* linear-oblong acute or obtuse, *arising from the broad base* of the stipule, and giving a more or less *palmate-pinnate* character to the stipule as a whole, *middle lobe broader*, *subentire*, or with few (2–4) crenulations. Peduncles ascending at an acute angle to the stem. *Flowers large*. Sepals linear-lanceolate acuminate ciliate, sometimes very sparsely so. *Petals longer than the sepals*, *brightly coloured*, the uppermost of an intense violet, subvelvety, the lateral ones blue-violet, bearded in the fauces, the lowest petal paler, with 5–7 striæ. The petals are sometimes marked with yellow. Spur as long as or a little longer than the sepaline appendages.

A plant generally of cultivated land. The size of the flower varies considerably. It may be comparatively small, but more

usually the corolla is large and brightly coloured, approaching *V. Lloydii* in this respect, but generally differing in the flower being wider in proportion to its length. The habit of the plant, however, is quite different, being usually cæspitose or subcæspitose, and the form of the stipule is totally different from that of *Lloydii*.

Billot, Fl. Gall. et Germ. no. 2025 (!) *in parte* is a small parti-coloured Pansy, but there seems to be a mixture here, as I have seen sheets which contain plants differing in no respect from *V. ruralis* as described above.

Var. *sulphurea* (nov. var.). This differs from the above principally in bearing pale yellow flowers, and in having more hairy stems, leaves, and stipules. It appears to be a perfectly constant variety, and may prove to be commoner than the more typical parti-coloured plant described above. Its relation to *V. alpestris* Jordan will be discussed at length hereafter. There is no doubt that this plant has repeatedly appeared under the name *alpestris*, and it is possible that it may be necessary to place this under *alpestris* as a short-spurred lowland variety.

11. Viola cantiana, sp. n.

Plant cæspitose, 5–8 in. in height, with many spreading or ascending, shortly hispidulous, slender branches arising from the base; branches straight, with long internodes. *Leaves shortly hispid or hispidulous* ciliate, lowest leaves rotund-ovate, very obtuse, crenate, the intermediate and upper ones lanceolate crenate, obtuse or subacute; *all the leaves small*, 1–1·5 cm. in length. *Stipules small, ciliate*, lateral lobes oblong-linear or linear arising from a broad base, the middle lobe spathulate, with few (2–4) crenations. *Peduncles* long, *slender, glabrous*. *Sepals narrow*, linear-lanceolate acuminate slightly ciliate, *appendages rather short*, oblong. *Petals much longer than the sepals*, upper petals blue paler at the base, lateral petals yellow with blue margins and with three violet striæ, lower petal umbilicate with a broad squarely truncate extremity. Spur a little longer than the sepaline appendages.

The very sharp and definite colouring of the petals is characteristic of this pansy; this and the cæspitose habit, the relatively long internodes, and the very small hairy or hispidulous leaves and small stipules render this plant easy to recognize. It is one of the best marked of our pansies. It seems to be very rare, and hitherto I have only met with it in Kent. "*Viola gracilescens* Jord." of Schultz's Herb. Norm. seems to agree with it, but I am quite unable to make this agree with Jordan's figure of *V. gracilescens* (Observations, ii.).

III. SAXATILES.

Plants of uncultivated land or of upland fields. Perennial, with underground perennating branches and many aerial flowering-

stems. Flowers large, petals longer than the sepals. Sepals linear or narrowly linear lanceolate, with rather small appendages. Spur longer than the sepaline appendages.

12. Viola macedonica

Boissier & Heldrich, Diag. Ser. 2, i. 52. Exsicc. Becker, Viol. Exsicc. Lief. vi. 1905, n. 157 (!); also Haussknecht, Iter Græc. 1885 (!).

Perennial (or possibly occasionally annual) with an *extensive development of rather stout horizontal stems*, which run *on or just below the surface* of the ground. These give rise to upright slightly flexuose branches, and themselves also become erect at the ends. The aerial stems are 9–12 in. in height, and are covered sparsely with very short hairs. Leaves somewhat hairy, ciliate, intermediate leaves oblong-ovate or oblong-lanceolate obtuse crenate, much narrowed into the petiole, the uppermost acute. Stipules rather hairy or downy, ciliate, the *middle lobes of the lower stipules subfoliose, with few (2–4) crenations, of the upper ones entire spathulate narrowed below*, the lateral lobes linear, arising near the base. Peduncles spreading at an acute angle from the stem, rather more divaricate in fruit. Sepals ciliate, narrowly linear-lanceolate acuminate, narrowed gradually almost from the base, appendages rather short. *Petals* much longer than the sepals, the *uppermost* oblong-spathulate, *narrow and diverging*, pale blue, the lateral petals pale blue, the lowest obcordate, pale blue near the margin, yellowish within, with a yellow umbilicus, and 5–7 faint striæ. Spur longer than the sepaline appendages.

This plant is readily distinguished from all other British pansies by its very narrow and diverging upper petals, its pale blue flowers, and its strong growth of horizontal stems. The very slender perennating branches found in the more typical *Saxatilis* pansies are not here present, but its relationships are evidently with the *Saxatilis* set. It is a plant of stony uncultivated ground.

13. Viola alpestris

Jordan, Observations, ii. p. 34. Exsicc. Magnier, Fl. selecta, n. 2142 (!).

Stem much branched and diffuse at the base, branches downy, ascending, straight or slightly flexuose, with long internodes. *Leaves $\frac{1}{4}$–$\frac{1}{3}$ as long as the internodes.* Lowest leaves cordate-oblong obtuse crenate, the intermediate ones oval-oblong obtuse, narrowed into the petiole, ciliate or hairy, the upper ones narrower. *Stipules* hairy and ciliate, those *of the lower leaves with an oval-obtuse crenate stalked middle lobe*, and narrow linear lateral lobes arising near the base, those *of the upper leaves with a spathulate entire or subentire middle lobe*, and short linear-oblong *lateral lobes arising successively* from near the base of the stipule *in a condensed pinnate fashion*. *Peduncles long, slender*, glabrous, spread-

ing at an acute angle from the stem. Sepals ciliate, narrowly lanceolate acuminate. *Petals* longer than the sepals, *pale yellow*, sometimes touched with violet, lowermost and lateral petals with blue striæ. Spur longer than the sepaline appendages.

This plant is best distinguished from *V. variata* Jord. var. *sulphurea* by the longer spur, narrower sepals, smaller leaves, and proportionately much longer internodes. *V. variata* var. *sulphurea* undoubtedly has been much confused with *alpestris*, but *alpestris* is a plant of stony uplands, and var. *sulphurea* a weed of cultivated fields. (See note under *V. variata* above.)

14. Viola lepida

Jordan, Pugillus, p. 28. Exsicc. Billot, n. 2019 (!).

6-12 in. in height. *Stems many*, slightly pubescent, *arising from a cæspitose base*, procumbent below, then ascending or vertical. *Perennial underground portions of the stem very slender.* Leaves puberulous crenate ciliate, the lowest ovate obtuse subcordate, the intermediate ovate-lanceolate, somewhat obtuse, the upper ones lanceolate subacute. *Stipules* hairy and ciliate, *middle lobe entire* or subentire, narrowly spathulate *not foliaceous*, the lateral lobes linear-oblong. The whole stipule is *palmate* or pinnate-palmate, *the middle lobe not exceeding the lateral ones very greatly in size.* Peduncles erect or erect-patent. Flowers large ($\frac{1}{2}$–$\frac{3}{4}$ in.). Sepals linear lanceolate acute or acuminate ciliate. Petals much longer than the sepals, the upper ones overlapping below, blue-violet, the lateral ones usually paler, the lowest broad, truncate, white or pale blue, yellow at the base, with 5–7 striæ. Spur longer than the sepaline appendages.

A plant of uncultivated land or of cultivated upland fields. It is a very well-marked plant with blue and white flowers, and with many upright or ascending flowering-stems.

15. Viola polychroma

Kerner, Schedæ ad Fl. Exsicc. Austro-Hungar. ii. 89 (1882).
Exsicc. Fl. Exsicc. Kerner, Fl. Austro-Hungar. No. 575 (!).

Perennial *cæspitose, with underground perennating stems. Aerial stems very many*, slightly downy, elongate shortly procumbent at the base, then erect to a height of 12–18 in., generally somewhat flexuose. Leaves ciliate and slightly hairy, lower leaves long-petioled, cordate-rotund or cordate-ovate, very obtuse, intermediate leaves ovate obtuse or subacute serrate-crenate, uppermost ovate-lanceolate or lanceolate acute. *Stipules* downy and ciliate, those *of the lower and middle leaves* subpalmatipartite *with 5–7 linear-oblong obtuse subequal entire lobes*, the middle lobe rather longer and broader than the rest. Stipules of the upper leaves more pinnatifid, the lateral segments arising successively for a short distance up the stipule, the middle lobe entire (occasionally with one or two shallow crenations), the lateral lobes acute linear. Peduncles very long. *Flowers very large* (1–1$\frac{1}{4}$ in.) *and brightly coloured.*

Sepals linear-lanceolate acuminate ciliate, hairy. Corolla much longer than the calyx. Upper petals diverging but overlapping below, bright blue, lateral petals yellow or more or less suffused with blue, lowest petal broadly triangular, truncate or subcordate-triangular, yellow, with 5–7 blue striæ. Sometimes all the petals are yellow. Spur slender, longer than the sepaline appendages.

This is by far the handsomest of all our British pansies. The flowers are very large and brilliantly coloured. The plants form clumps with as many as twenty or more flowering-stems. This plant grows in uncultivated stony land. I have only found it in the Peak of Derbyshire, where it is locally abundant.

16. Viola Provostii

Boreau, Fl. du Centre, ed. 3, ii. p. 82. Exsicc. Paillot, Vendrely, Flagey et Renauld, Floræ Sequaniæ Exsicc. n. 17 (!).

Stems with perennial underground growth, and *long, often rather stout, very finely downy flowering-stems*, which are *decumbent at the base, then ascending*. There are many short leafy stems arising from the rhizomes. *Internodes very long*. Leaves ciliate, slightly downy below, the lowermost subcordate oval or rounded obtuse contracted into the petiole. *Stipules* ciliate, pinnatifid, the *lateral lobes* linear-lanceolate acute, a little curved, *arising successively up the stipule, middle lobe* oblong obtuse or acute, with one or more crenulatures, or entire, *not foliaceous*. *Peduncles very long*, arising in the axils of leaves for a long distance down the stem. Sepals narrowly triangular-lanceolate acuminate ciliate. *Corolla large, pale yellow*. Upper petals overlapping, lowest broadly triangular truncate-obcordate, base with violet striæ. Spur longer than the calycine appendages.

A plant of stony uplands. It is a large spreading plant, with the peduncles arising in the axils of leaves on the decumbent and ascending branches, and is readily recognized by its very long peduncles and pale yellow flowers. Our British examples only differ from the Continental plants which I have examined in having rather broader leaves, but some Continental plants so named approach our own plants very closely in this respect.

Cultivated plants of *V. lutea* Huds. approach *V. Provostii* in superficial characters, but the shape and colour of the flowers (broader in proportion to the length and much paler yellow) and the form of the stipules serve to distinguish it. Moreover, I have never seen a wild *lutea* at all approaching *Provostii*.

17. Viola multicaulis

V. lutea γ *multicaulis* Koch, Syn. Fl. Germ. 76 (1857). Exsicc. Baenitz, Herb. Europ. ann. 1885 and 1886 (!).

Plant 7–10 in. in height, with very slender underground perennial branches, and *straight, vertical or ascending* slightly hairy *stems many of which bear leaves only*. Leaves ciliate, lowest very broadly ovate subcordate crenate, intermediate and upper leaves lanceo-

late or ovate-lanceolate, much narrowed into the petiole, obtuse or subacute crenate. *Stipules* ciliate *palmate*, with linear lateral lobes and linear-oblong obtuse *non-foliaceous middle lobe, similar to but larger than the lateral lobes. Peduncles very long* and *slender*. Sepals linear acute, slightly ciliate. Petals longer than the sepals, bright yellow or parti-coloured with blue predominating on the upper petals, upper petals diverging not overlapping or only overlapping at the base. *Flower similar to a small* lutea *in form*, but lowest petal less squarely truncate and more rounded.

This pansy is placed by Koch under *V. lutea* as a variety, but it seems to fall perfectly naturally into the *Saxatilis* group. It is a plant of rough stony uncultivated land, generally in upland districts.

18. Viola carpatica

Borbás in Oesterr. Bot. Zeitsch. xli. 422 (1891).

Plant 12–18 in. in height, with underground perennial branches, some of which turn up vertically and bear flowers. Flowering-branches rather stout, glabrous or very slightly downy, straight above and rather flexuose below. Leaves ciliate, lowermost obtuse crenate, intermediate dentate or crenate-dentate, lanceolate obtuse, *upper leaves narrowly lanceolate dentate* acute. Stipules ciliate, those of the lowest leaves palmately pinnate, lateral lobes linear, *middle lobe oblanceolate obtuse, with 2–4 crenations. Stipules of the upper leaves pinnate*, with linear acute lateral segments and *long linear slightly dentate or subentire middle lobe*. Peduncles long. Sepals linear-lanceolate ciliate acuminate. *Corolla large*, petals longer than the sepals, *upper petals overlapping*, purple-violet, lateral ones paler, the lowest petal pale purple, whitish towards the yellow base, with 5–7 striæ.

The description has been drawn up from specimens named by Prof. Borbás, kindly lent to me by Mr. Wheldon. I do not consider the *name* satisfactory, as *V. carpatica* was described by Borbás as a hybrid, and I cannot find any traces of hybridity in the Lancashire plants named by him. The pansy itself seems to be very distinct.

Chapter II.

IV. LUTEÆ.

Perennial upland plants with very slender underground perennating branches, small vegetative development, and few large flowers on long peduncles. Petaline spur long and very slender.

19. Viola lutea

Hudson, Fl. Angl. p. 31 (1763). Exsicc. F. Schultz, Fl. Gall. et Germ. n. 111 (!) Herb. Norm. n. 1019 (!).

Plant perennial, with *extremely slender perennating underground stems*, which grow upwards and bear small foliage leaves. *Aerial stem* slender, *short, usually 1–3 in.* in height, upright, glabrous or

slightly hairy. Lower leaves broadly ovate or orbicular obtuse crenate glabrous, more or less ciliate, with long petioles; intermediate and upper leaves ovate or ovate-lanceolate obtuse or subacute, hairy or glabrescent, margin crenate, ciliate, ciliations often rigid. *Stipules very small, digitate*, ciliate, those of the lower leaves with middle lobe linear, entire, lateral lobes few, linear, rather smaller than the middle lobe; stipules of intermediate and upper leaves larger, with spathulate entire middle lobe. *Peduncles very long*, upright, straight, slender, glabrous, *usually only one or two on each subaerial shoot. Flowers very large*, 1–1¼ *in. in length, generally much longer than broad.* Sepals linear or linear-lanceolate, acuminate, glabrous, sometimes ciliate; sepaline appendages short. Petals two to three times as long as sepals, *bright yellow*, the two upper ones diverging but often overlapping towards the base, lateral and lowest petals marked with deep violet striæ, *lowest petal* broad, *strongly umbilicate, petaline spur* slender, *much longer than the sepaline appendages.*

A plant of upland grassy places and pastures, growing amongst short grass. It is particularly plentiful on Carboniferous Limestone, but also occurs on Millstone Grit, though apparently much less frequently.

Var. *Murrayi* (nov. var.). This plant differs from typical *lutea* in several respects. The most striking feature is the development of runners, which arise in the axils of leaves at the base of the stem and run horizontally for several inches just below the surface of the ground, and then turn up to form short flowering-stems like the parent; these in turn give off axillary branches, which repeat the process, thus producing a sympodial growth. The runners are stiff and wiry, and quite unlike the very delicate underground stems of *lutea* proper. The short aerial stems are densely clothed with broadly ovate or cordate leaves, and the peduncles are less straight and upright than in *lutea*.

This is a very well-marked variety. It was collected on the sandy shore of Loch Muick by my friend Mr. Cecil Hay Murray, B.Sc., after whom I have named it.

Var. *amœna* Henslow, Cat. Brit. Pl. 3 (1829) seems to be merely a colour variety of *lutea*, with which it agrees in all respects except in the possession of blue-violet flowers. Intermediates between this and true *lutea* exist, and the wisdom of perpetuating the name is doubtful.

V. CURTISIEÆ.

Perennial plants of maritime sandhills, with subterranean slender branching perennial stems. Flower with petals longer than the sepals, and with long petaline spur.

20. Viola Curtisii

E. Forster in E. Bot. t. 2693 (1831).

Plant 12–18 in. or less, with long branching wiry root-system and perennating subterranean branches which turn up-

wards and bear foliage leaves and flowers. Stems more or less cæspitose, somewhat flexuose, slightly hairy. Basal leaves long-petioled, broadly ovate, very obtuse, with a few shallow crenulations; intermediate leaves ovate obtuse or subacute, crenate, usually ciliate; uppermost leaves ovate-lanceolate, obtuse or acute. Stipules digitate, with entire oblong or spathulate obtuse middle lobe, and linear acute lateral lobes. Flowers many, large, peduncles arising from the axils of leaves for some distance down the stem. Sepals linear-lanceolate, finely denticulate or ciliate, with small appendages. *Petals yellow* (occasionally tinged with violet or blue), longer than the sepals. Spur slender, longer than the sepaline appendages.

A large plant of maritime sandhills.

21. Viola Pesneaui

E. G. Baker in Journ. Bot. 1901, 9.

V. tricolor δ *Pesneaui* Lloyd, Fl. Ouest Fr. ed. 3, 43 (1876).

Plant 6–10 in. in height, with perennating subterranean stems, which turn upwards and bear foliage-leaves and flowers. *Stems distinctly hairy, strongly cæspitose*, often forming a very bushy growth. Leaves glabrous, with ciliate petioles; lower leaves suborbicular or ovate obtuse crenate, intermediate and upper leaves oblong-lanceolate obtuse crenate. Stipules digitate, with linear obtuse or acute entire middle lobe, and small linear acute lateral lobes. Sepals narrowly linear-lanceolate or linear, with short appendages. *Corolla blue-violet*, the lowermost petal more or less tinged with yellow. (Sometimes the lowermost petal may be entirely yellow, and the yellow tinge may invade the lateral petals also.) Spur much longer than the sepaline appendages.

A plant of maritime sandhills, differing from *V. Curtisii* in the blue flowers, smaller growth, more strongly cæspitose habit, and usually more hairy stems.

22. Viola sabulosa

"Bor. Not. 3" (ex Index Kewensis); Dumort. in Bull. Roy. Soc. Belg. vii. 353 (1868).

V. tricolor λ *sabulosa* DC. Prodr. i. 304 (1824). Exsicc. Billot. n. 2422 (!)

Lower leaves oval, *intermediate leaves narrowly lanceolate*, the *upper leaves long and sublinear*; plant glabrescent. Upper petals violet, the lower yellow at the base.

This plant differs from the other members of the *Curtisii* section in having long and very narrow leaves. Some of our British Pansies seem to be referable to this species, but I have not seen any with leaves so long and narrow as certain specimens from the West of France.

VI. NANÆ.

Dwarf plants with stem-leaves entire and with very minute flowers.

23. Viola nana

Corbière, Fl. Normandie, 81 (1893).

V. tricolor π *nana* DC. Prodr. i. 304 (1824).

Plant very small, 1–2 in. in height. Stem unbranched, smooth or slightly hairy, with short internodes. Radical leaves broadly oval, very obtuse, entire or crenate, glabrous, petiolate; *stem-leaves* oblong-lanceolate, *entire*, very obtuse, sometimes slightly ciliate. Stipules ciliate or non-ciliate, with entire linear oblong middle lobe, and usually only one or two lateral lobes on each side. Peduncles ascending with flower, divaricate with fruit. *Flower very small,* ¼ *in.* or less in length. Sepals oblong-lanceolate, acute, glabrous, with small and short appendages. Corolla white or pale yellow, occasionally tinged with blue on the upper petals. Petals shorter than the sepals. Lower petal with a *very short spur*.

A plant of the sands and shingly beaches in the Channel Islands and the Scillies. Readily recognized by its dwarf habit and minute flowers. In cultivation the plant grows to a larger size, but retains the entire stem-leaves and general characters unchanged.

I add a key to the Pansies of the *Arvensis*, *Tricolor*, and *Saxatilis* sections described above. This clavis has been compiled with the utmost care, but in dealing with a group of critical plants like the Pansies the use of a clavis is dangerous unless constant reference be made to the full descriptions. Only well-grown healthy plants should be dealt with until the student becomes familiar at sight with most of the commoner species, when the less normal individuals will in general be readily recognized.

General Key to the Groups.

(1.) Annual plants without perennating branches; all the branches sub-aerial throughout. Flowers with petaline spur not longer than or only very slightly exceeding the calycine appendages..... 2

(1.) Perennial or biennial plants with perennating branches for the most part subterranean at the base. Flowers with long petaline spur..... 4

(2.) Minute plants of the seashore with entire cauline leaves... *V. nana*

(2.) Taller plants of cultivated land..... 3

(3.) Flowers small, usually white or pale yellow ..... Arvenses

(3.) Flowers large, tricoloured or yellow ..... Tricolores

(4.) Plants of maritime sand-dunes ..... Curtisieæ

(4.) Plants of uncultivated land or upland pastures 5

(5.) Plants with many flowers and considerable vegetative development Saxatiles

(5.) Plants with few large flowers and short vegetative stems ... Luteæ

Key to the Arvensis Section.

(1.) Plants very small, with simple unbranched stem 2

(1.) Plants larger, stem generally branched 3

(2.) Stems straight, pedicels erect ..... *derelicta*

(2.) Stems very flexuose, pedicels widely divaricate ..... *arvatica*

(3.) Middle lobe of stipule broad, markedly crenate or dentate 4
(3.) Middle lobe of stipule slightly crenate or entire..... 6

(4.) Lateral lobes arising for some distance up the stipule, middle lobe broad obtuse ..... *ruralis*
(4.) Stipules digitate, with middle lobe very foliaceous and similar to the leaves in form 5

(5.) Leaves obtuse ..... *obtusifolia*
(5.) Leaves acute ..... *agrestis*

6. Stipules with middle lobe long, entire 7
6. Stipules with middle lobe somewhat crenate or dentate 8

7. A large plant with middle lobe of stipule broadly linear ... *segetalis*
7. A smaller plant, generally branching from the base, middle lobe of stipule very narrowly linear ..... *subtilis*

8. Lateral lobes of stipule arising successively for some distance up the stipule, middle lobe somewhat foliaceous, sepaline appendages and spur of corolla usually purple..... *Deseglisei*
8. Stipules with very narrowly linear middle lobe ..... *subtilis*

Key to the Tricolor Section.

Leaves long, stipules digitate, with lanceolate-oblong, entire, or slightly crenate middle lobe ..... *Lloydii*
Plant cæspitose, stipules with lateral lobes spreading more or less horizontally, and usually arising for some distance up the stipule, middle lobe short and broad ..... *variata*
Plant cæspitose, with *very small leaves* (1–1·5 cm.) *and stipules.* Middle lobe of stipule short, spathulate; whole plant very hairy; peduncles very slender. Plant smaller in all its parts (except flowers) than *variata*..... *cantiana*

Key to the Saxatilis Section.

(1.) Perennating bases of branches rather stout, lying just below the ground 2
(1.) Perennating branches slender, generally arising deep in the ground 3

(2.) Flowers pale blue or blue and yellow, upper petals widely diverging and very narrow, branches running horizontally for some distance on or just beneath the surface of the ground ..... *macedonica*
2. Petals yellow (uppermost occasionally touched with blue), plant cæspitose, stipules with lateral lobes arising for some distance up the stipules ..... *alpestris*

(3.) Stipules pinnatifid 4
(3.) Stipules digitate (stipules of upper leaves sometimes becoming slightly pinnate) 5

(4) Middle lobe of stipules of lower leaves crenate, leaves dentate, upper leaves narrowly lanceolate dentate very acute, plant upright, flowers parti-coloured ..... *carpatica*
(4.) Middle lobe of stipules of lower leaves entire or subentire, plant spreading, flowers pale yellow on very long peduncles arising in the axils of leaves for some distance down the stem ... *Provostii*

(5.) Plant with many leafy non-flowering shoots, upper leaves ovate-lanceolate or broadly lanceolate ..... *multicaulis*
(5.) All the stems flowering 6

(6.) Flowers very large (1–1¼ in.), brilliantly parti-coloured (or bright yellow) ..... *polychroma*
(6.) Flowers smaller (½ in. or slightly larger)..... *lepida*

Hybrids.

Where two species grow in close association, individuals are occasionally to be found which are not referable to any known species, and which combine more or less the characters possessed separately by the species with which they are growing, and also at the same time present other features not shown by their associates. Such individuals occur sporadically, and *only* in close association with two or more distinct species. Hitherto I have not put the hybridity of these plants to direct experimental test, but the evidence in favour of regarding the above-mentioned plants as hybrids is very strong, and, indeed, to anyone seeing these plants growing side by side with the supposed parents it is quite convincing.

A feature of all these hybrids is the very characteristic alteration in form of the stipules. These become enlarged, the base of the stipule is much broadened, and the lateral lobes are carried a long way up the stipule and are often shortened. This form of stipule is so characteristic of the plants regarded as hybrids, that I should consider its occurrence good evidence in itself of the hybrid nature of a plant, even if I did not see this plant associated with its supposed parents.

The following hybrids have been recognized:—

Viola obtusifolia × the Garden Pansy.

Plant up to 12 in. in height; stem branched below; branches stout, upright, or decumbent at base, more or less hairy; lower leaves broadly ovate, long-petioled, deeply and coarsely crenate, intermediate and upper leaves very large, broadly lanceolate or ovate-lanceolate obtuse; stipules very large; middle lobe broadly lanceolate, narrowed below, entire, or with a few rounded crenulations, lateral lobes arising for some distance up the stipule, thus giving a pinnate character to the organ as a whole; peduncles long; sepals broadly lanceolate acute, hairy, and ciliate, sepaline appendages large; corolla white, pale yellow or with the upper petals suffused with blue; petals not longer than the sepals.

Growing with both parents at Wallasey, Cheshire (E. and H. Drabble).

Viola Lloydii × the Garden Pansy.

Stem simple or branched upright or spreading slightly, rather stout, with short hairs; lower leaves ovate, intermediate and upper leaves ovate-lanceolate, all the leaves crenate and very obtuse; stipules large, middle lobe entire or crenate, lateral lobes directed obliquely forwards and arising for some distance up the stipule; peduncles long, slender; sepals broadly lanceolate acute (in a specimen from Wisley some of the flowers have pinnatifid sepals resembling stipules on a small scale); corolla very large (1–1½ in.), brightly parti-coloured, petals much longer than the sepals, petaline spur not longer than the sepaline appendages.

Growing with both parents at Norton, Derbyshire (E. Drabble), and at Wisley, Surrey (F. J. Chittenden).

Viola polychroma × Lloydii.

Stems 18–24 in. in height, simple or branched from the base, rather slender, slightly hairy; lower leaves oblong-lanceolate obtuse deeply crenate, intermediate and upper leaves lanceolate acute or subacute crenate or bluntly dentate; stipules similar to those of *V. polychroma*, but with a lengthened and broadened base, the lateral lobes being carried up the stipule for some distance, middle lobe oblong obtuse or subacute entire; peduncles long and very slender; bracteoles a long way below the curvature; flower about $\frac{3}{4}$ in.; sepals linear acuminate, hairy and ciliate; petals longer than the sepals, blue and white with a yellow throat, petaline spur equalling or slightly exceeding the sepaline appendages.

Growing with both parents near Eyam, Derbyshire (E. and H. Drabble).

Several herbarium specimens have been seen which strongly suggest a hybrid origin, but, in the absence of further evidence, it is safer not to record these.

Chapter III.

Distribution.

I am greatly indebted to many botanists for their kindness in allowing me to examine the British Pansies in their herbaria; my thanks are especially due Mr. Charles Bailey, Mr. S. H. Bickham, Mr. G. C. Druce, Dr. W. J. Fordham, Mrs. E. S. Gregory, Messrs. H. & J. Groves, Miss I. M. Hayward, Rev. Augustin Ley, Rev. F. E. Linton, Rev. E. S. Marshall, Mr. C. E. Salmon, Mr. J. A. Wheldon, to Prof. F. E. Weiss and Mr. Murray for permission to examine the specimens in the Manchester Museum, and to the authorities at the Natural History Museum and at Kew. My thanks are also due to many correspondents, far too many to mention individually, who have at great expense of time and trouble furnished me with fresh specimens from various parts of the country. The following summary of the distribution of the species must of necessity be incomplete, but it represents the present state of my knowledge of the subject. I *alone* am responsible for the identification of the plants; the names or initials in brackets refer to the collector, or, in a few cases, to the owner of the herbarium in which the plant referred to lies. Only plants which I have actually examined are here recorded.

1. Viola agrestis Jordan.

(1) West Cornwall. Truro (H. Drabble); Newquay (C. C. Vigurs); Gilly Tresamble (F. H. Davey).
(6) North Somerset. Glastonbury (Herb. E. S. Gregory); Wraxall Hill (J. S. White).
(9) Dorset. Broadstone (Miss Harris).
(16) West Kent. Grove Park (J. Groves).
(17) Surrey. Hindhead (C. Bailey); Worplesdon (W. R. Linton).
(21) Middlesex. Fulwell (W. H. Brown).
(23) Oxford. Barton (ex herb. G. C. Druce).

(24) Bucks. Denham, Brickhill, Amersham (G. C. Druce).
(31) Hunts. Woodwalton Fen (E. W. Hunnybun).
(33) E. Gloucester. Cheltenham (ex herb. W. L. Notcutt).
(35) Monmouth. Raglan (C. Bailey).
(36) Hereford. Moorhampton (J. S. White).
(40) Salop. Church Stretton (C. Bailey).
(41) Glamorgan. Llwydcoed (H. S. Riddelsdell).
(43) Radnor. Llandrindod (C. Bailey).
(55) Leicester. South Knighton (W. Bell).
(56) Nottingham. Misson (E. & H. Drabble).
(57) Derby. Linacre, Cathole (E. Drabble); Derby (herb. T. Gibbs).
(58) Chester. Malpas, Tilston (ex herb. A. H. Wolley-Dod); Birkenhead, Delamere, Sandback (C. Bailey).
(59) South Lancaster. Mossley, Hightown (E. Drabble); Warrington (ex herb. T. Barrow); Blundell Sands (J. H. Lewis); Walton (J. A. Wheldon).
(60) West Lancaster. St. Anne's (C. Bailey).
(61) South-east Yorkshire. Rossmoor (herb. E. S. Gregory).
(66) Durham. Hart (F. A. Lees).

2. Viola segetalis Jordan.

(1) West Cornwall. Truro (H. Drabble); Perranarworthal (F. H. Davey).
(15) East Kent. Folkestone (C. Bailey).
(23) Oxford. Burford Downs (G. C. Druce).
(24) Bucks. Burnham Beeches (G. C. Druce).
(45) Pembroke. St. David's (E. F. D.).
(55) Leicester. Lutterworth (W. Bell).
(56) Nottingham. Misson (E. & H. Drabble).
(57) Derby. Norton Lees, Bretton, Brampton (E. Drabble).
(58) Chester. Bromborough (J. W. Burton).
(59) South Lancaster. Withington, Manchester, Southport (C. Bailey).
(60) West Lancaster. St. Anne's (C. Bailey).
(64) Mid-west Yorkshire. Sowerby (J. G. Baker).
(79) Selkirk. Melrose (herb. G. C. Druce); Galashiels, Lindean Pebbles (Miss I. M. Hayward).
(91) Kincardine. Bervie (C. Bailey).
(107) E. Sutherland. Dornoch (R. S. Standen).

3. Viola subtilis Jordan.

(14) East Sussex. Hellingly (Miss E. Bray).
(23) Oxford. Oxford, Hayford (G. C. Druce).
(60) West Lancaster. Cockerham Moss (J. A. Wheldon & A. Wilson).
(70) Cumberland. Wythburn (E. & H. Drabble).

4. Viola Deseglisei Jordan.

(1) West Cornwall. Pentire (E. & H. Drabble).
(9) Dorset. Morden Decoy (E. F. Linton).
(21) Middlesex. Finchley (E. & H. Drabble).
(27) East Norfolk. Stalham (Miss M. Pallis).

(57) Derby. Ashover Hay (E. Drabble).
(58) Chester. Wallasey (E. & H. Drabble).

5. Viola obtusifolia Jordan.

Sarnia. Sark (G. C. Druce).
(6) North Somerset. Portishead (Mrs. E. S. Gregory); Wraxall (J. S. White).
(9) Dorset. Kinson (E. F. Linton).
(12) North Hants. Farnham (W. L. Notcutt).
(14) East Sussex. Bexhill (E. Drabble).
(17) Surrey. Wisley (F. J. Chittenden).
(24) Bucks. Brickhill (G. C. Druce).
(40) Salop. Church Stretton (C. Bailey); Rednall (A. E. Lomax).
(42) Brecon. Llangammarch (A. Ley).
(54) North Lincoln. Cleethorpes (E. & H. Drabble).
(55) Leicester. Leicester (W. Bell).
(56) Nottingham. Misson (E. & H. Drabble).
(57) Derby. Chesterfield, Grindleford (E. & H. Drabble).
(58) Chester. Burton Point, New Brighton (E. & H. Drabble); Sandback (C. Bailey); Wilmslow (J. Burrow).
(59) South Lancaster. Prescott, Southport (E. Drabble); mouth of Alt (J. H. Lewis); Manchester (C. Bailey).
(60) West Lancaster. St. Anne's (E. Drabble).
(95) Elgin. Forres (C. Bailey).

6. Viola ruralis Jordan.

(6) North Somerset. Wraxall (J. S. White).
(12) North Hants. Odiham (Miss C. E. Palmer).
(13) West Sussex. Selham (E. S. Marshall).
(16) West Kent. Cobham (E. Drabble).
(22) Berks. Lambourn Valley (G. C. Druce).
(23) Oxford. Woodstock, Cowley (G. C. Druce).
(24) Bucks. Winslow, Wobern Green, Okeley, Amersham, Hampden (G. C. Druce).
(26) West Suffolk. Cavenham (E. S. Marshall).
(27) East Norfolk. Sprowston (E. F. Linton); Stalham (Miss Pallis).
(30) Bedford. Wootton (G. C. Druce).
(32) Northampton. Harleston (G. C. Druce).
(33) East Gloucester. Cheltenham (ex herb. W. L. Notcutt).
(57) Derby. Wingerworth (E. & H. Drabble); Repton (herb. E. F. Linton).
(58) Chester. Burton Point, Wallasey, New Brighton (E. & H. Drabble); Lindow Common, Ashley (C. Bailey).
(59) South Lancaster. Ince Blundell (E. Drabble); Formby (J. H. Lewis); Southport (C. Bailey).
(64) Mid-west Yorkshire. Sowerby (J. G. Baker).
(72) Dumfries. Moffat (C. Bailey).
(81) Berwick. Law (Miss I. M. Hayward).
(91) Kincardine. Bervie (C. Bailey).
Ireland: Tyrone. Clogher (C. L. Peck).

Var. GLABRA Drabble.

(14) East Sussex. Bexhill (E. Drabble).

7. VIOLA ARVATICA Jordan.

(24) Bucks. West Wycombe (G. C. Druce).
(37) Worcester. Bredon Hill (N. Sanders).
(55) Leicester. South Knighton, Cadby (W. Bell).
(57) Derby. Boythorp (E. Drabble).

8. VIOLA DERELICTA Jordan.

(57) Derby. Linacre (E. Drabble).
(88) Mid Perth. Killin (E. F. Linton).
(90) Forfar. Dundee (C. H. Murray).
(92) South Aberdeen. Ballater (C. H. Murray).
(94) Banff. Glen Avon (E. S. Marshall).
(111) Orkney. Stromness (E. S. Marshall).

9. V. LLOYDII Jordan.

(9) Dorset. Bradbury (E. F. Linton).
(11) South Hants. Wington, Christchurch (Miss Harris).
(12) North Hants. Odiham (C. E. Palmer).
(15) East Kent. Sandling (E. S. Marshall).
(16) West Kent. Sevenoaks (E. Drabble).
(17) Surrey. Whitley (E. S. Marshall).
(27) East Norfolk. Sherringham (C. B. Headley).
(36) Hereford. Brilley (S. H. Bickham).
(40) Salop. Grinshill (H. A. Jones).
(42) Brecon. Llangammarch (A. Ley).
(49) Carnarvon. Nevin (C. Bailey).
(55) Leicester. Abbey Park, Leicester (W. Bell).
(56) Nottingham. Shelley, Misson (E. & H. Drabble).
(57) Derby. Norton Lees, Far Lees (W. J. Fordham); Froggatt, Chapel-en-le-Frith, Eyam, Linacre (E. Drabble).
(58) Chester. Wallasey (E. & H. Drabble); Oldcastle Mill, Malpas (A. H. Wolley-Dod).
(60) West Lancaster. Cockerham Moss (J. A. Wheldon & A. Wilson); Pilling (D. A. Jones & J. A. Wheldon).
(61) South-east Yorkshire. Bawtry (E. & H. Drabble).
(62) North-east Yorkshire. Rillington (G. Webster).
(64) Mid-west Yorkshire. Baildon (Miss Page); Bingley, Shipley (J. Cryer).
(68) Cheviotland. Wooler (Miss I. M. Hayward).
(69) Westmoreland. Arnside (C. Bailey).
(70) Cumberland. Carlisle (C. Bailey).
(90) Forfar. Forfar (G. C. Druce).
(91) Kincardine. Stonehaven (C. Bailey).
(92) South Aberdeen. Ballater, Braemar (G. C. Druce); Aberdeen (G. Nicholson).
(105) West Ross. Loch Duich (F. J. Chittenden).
(109) Caithness. Wick (E. S. Marshall).
Ireland: Armagh. Lough Gilly (G. C. Druce).

Var. INSIGNIS Drabble.

(17) Surrey. Wisley (F. J. Chittenden).
(55) Leicester. Abbey Park, Leicester (W. Bell).
(56) Nottingham. Shelley (E. Drabble).
(57) Derby. Norton (E. Drabble).
(64) Mid-west Yorkshire. Shipley, Bingley (J. Cryer).

10. VIOLA VARIATA Jordan (including var. SULPHUREA).

(1) West Cornwall. St. Just (J. Groves).
(16) West Kent. Ide Hill (C. E. Salmon).
(17) Surrey. Norbury, Gomshall (C. E. Salmon).
(20) Herts. Albury (G. C. Druce).
(27 or 28) Norfolk. Foulsham (ex herb. W. L. Notcutt).
(39) Stafford. Stone (Miss Everitt).
(51) Flint. Holywell (Isaac Cooke).
(58) Chester. Bidston (E. & H. Drabble); Wilmslow, Adlington (C. Bailey); Bowden (S. H. Bickham).
(59) South Lancaster. Manchester, Chat Moss (C. Bailey).
(62) North-east Yorkshire. Thirsk (J. G. Baker).
(63) South-west Yorkshire. Heeley (herb. T. Gibbs).
(69) Westmoreland. Rydal (? H. Fisher).

Var. SULPHUREA Drabble.

(9) Dorset. Blanford (E. F. Linton).
(20) Herts. Albury (G. C. Druce).
(23) Oxford. Oxford, Littlemore, Cowley, Woodstock (G. C. Druce).
(24) Bucks. Slough, Denham, Beaconsfield (G. C. Druce).
(36) Hereford. Hope Mansell (A. Ley).

11. VIOLA CANTIANA Drabble.

(16) West Kent. Sevenoaks (E. Drabble).

12. VIOLA MACEDONICA Boissier & Heldrich.

(57) Derby. Near Wirksworth (E. Drabble).

13. VIOLA ALPESTRIS Jordan.

(79) Selkirk. Near Selkirk, Galashiels (Miss I. M. Hayward).

14. VIOLA LEPIDA Jordan.

(15) East Kent. Sandling Park, Benenden (E. S. Marshall).
(16) West Kent. Wrotham, Sevenoaks (E. Drabble); Knockholt (S. E. Chandler).
(36) Hereford. Cowley Pool (A. Ley).
(39) Stafford. Leek (A. G. Walters).
(56) Nottingham. Everton, Misson (E. & H. Drabble).
(57) Derby. Eyam (E. Drabble).
(59) South Lancaster. Simonwood (J. A. Wheldon).
(63) South-west Yorkshire. Huddersfield (T. W. B. Ingle).
(70) Cumberland. Penrith (C. Bailey).
(80) Roxburgh. Melrose (C. Bailey).

(81) Berwick. Ayton (C. Bailey).
(91) Kincardine. Stonehaven (J. Groves).
(92) South Aberdeen. Ballater (C. H. Murray).
(95) Elgin. Forres (C. Bailey).
(96) Easterness. Aviemore (J. Groves).
(97) Westerness. Glen Spean (E. S. Marshall).
(98) Argyle. Dalmalley (E. S. Marshall).
(106) East Ross. Achilty Inn (E. S. Marshall).

15. VIOLA POLYCHROMA Kerner.

(57) Derby. Bretton (E. Drabble); Eyam (E. & H. Drabble).

16. VIOLA PROVOSTII Boreau.

(36) Hereford. St. Weonard's (A. Ley).
(39) Stafford. Ecton (W. H. Purchas).
(57) Derby. Castleton (C. Bailey).
(62) North-east Yorkshire. Thirsk (J. G. Baker).

17. VIOLA CALAMINARIA Lej. (*V. lutea γ multicaulis* Koch).*

(57) Derby. Wadshelf (E. Drabble); Sheldon, Eyam (E. & H. Drabble).

18. VIOLA CARPATICA Borbás.

(60) West Lancaster. Cockerham Moss, Pilling (J. A. Wheldon).
(64) Mid-west Yorkshire. Newton in Bowland (ex herb. J. F. Pickard).
(69) Westmoreland. Ambleside (E. F. Linton).

19. VIOLA LUTEA Hudson (including var. AMŒNA Henslow).

(?4) North Devon. Exmoor (A. Lyons, herb. E. S. Gregory).
(40) Salop Caradoc (H. J. Jones).
(43) Radnor. Reeve's Hill (Herb. Kew.); Llandrindod (C. E. Palmer).
(48) Merioneth. Ilroy (H. & J. Groves); Bala (H. S. Foster); Pen Machno (A. Ley).
(49) Carnarvon. Bangor (herb. E. S. Gregory); Devil's Bridge (Mrs. Henley).
(57) Derby. Buxton, Chapel-en-le-Frith, Ashover, Bonsall, Matlock, Cromford, Bretton, Castleton, Eyam, Middleton-by-Youlgreave (E. Drabble); Wirksworth (T. Gibbs); Blackwell (W. R. Linton); Wardlow Hay Cop (C. Bailey).
(64) Mid-west Yorkshire. Malham Cove (S. E. Chandler); Pateley Bridge (T. N. Ferrier); Halifax (S. King).
(65) North-west Yorkshire. Hawes (A. A. Moore).
(66) Durham. Upper Teesdale (E. S. Marshall); High Force (T. Gibbs); Auckland (J. P. Souther).
(67) Northumberland. Barton Mill (C. Bailey).

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* Since the description on pp. 11–12 was published, I have found that the name *Viola multicaulis* is preoccupied by an entirely different plant (Jordan, Pugillus p. 15). If we follow Rouy and Foucaud in regarding *V. calaminaria* Lej. as equivalent to *V. lutea γ multicaulis* Koch the species must stand as *Viola calaminaria* Lej. Rev. fl. Spa., 49.

(70) Cumberland. Borrowdale (Herb. Kew.).
(72) Dumfries. Moffat (E. F. Linton); Sanquhar (A. Davidson).
(79) Selkirk. Galashiels, Ettrick Bridge (Miss I. M. Hayward); Bowhill (A. Brotherston); Whitmuir Hill (E. S. Marshall).
(86) Stirling. Campsie Hills (herb. J. H. Lewis).
(88) Mid Perth. Ben Lawers (E. S. Marshall); Fortingal, Craig Caillich (E. F. Linton).
(89) East Perth. Killin, Spittal of Glen Shee, Glen Carness (E. S. Marshall); Glen Ardle (A. Ley).
(90) Forfar. Lorn Hill, Dundee (W. Gardener); Glen Dol, Clova (E. S. Marshall).
(92) South Aberdeen. Glen Callater, Glen Derry, Braemar (E. S. Marshall); Glen Muick (C. H. Murray).
(97) Westerness. Tulloch, Glen Spean (E. S. Marshall).
(98) Argyle. Benderloch (H. & J. Groves).

20, 21, 22. Viola Curtisii Forster (including V. Pesneaui and V. sabulosa).

(1) West Cornwall. Sennan (F. J. Hanbury); Land's End (W. Curnow).
(4) North Devon. Braunton Burrows (E. M. Holmes).
(41) Glamorgan. Whitford Burrows Gower, Crymlyn Burrows, Swansea (E. F. Linton); Port Talbot Burrows (herb. E. S. Marshall).
(44) Carmarthen. Pembrey Burrows (E. S. Marshall); Kidwelley Burrows (H. L. Jones).
(48) Merioneth. Llanaber (G. Goode); Barmouth (C. Bailey).
(52) Anglesea. Llyn Coron (S. H. Bickham); Bodafon, Penrhos, Holyhead, Aberffraw (C. Bailey).
(58) Chester. New Brighton sand-hills (H. C. Sanson, 1846) (now extinct, E. D.); Wallasey (J. H. Lewis, 1873) (now extinct, E. D.).
(59) South Lancaster. Birkdale, Southport (E. Drabble).
(60) West Lancaster. Lytham, St. Anne's (E. Drabble); Blackpool (C. Bailey).
(68) Cheviotland. Ross Links (H. E. Fox).
(92) South Aberdeen. Aberdeen (E. S. Marshall).
(100) Clyde Isles. Arran (no authority).
(103) Mid Ebudes. (S. M. Macvicar).
(108) West Sutherland. Durness (F. C. Crawford); Far-out Head (F. J. Hanbury).
(109) Caithness. Dunnett Links, Keiss Links (E. S. Marshall).

Ireland:
Dublin. North Bull, Sutton (W. T. Dyer).
Kerry. Cloghane, Stradelly (E. S. Marshall).
Wexford. Rosslare, Raven Point (G. C. Druce).
Down. Dundrum (C. H. Waddell).
Galway. Roundstone (E. F. Linton).
Antrim. Lough Neach (S. A. Stewart).
Cork. Castle Treke (J. Groves).

23. VIOLA NANA Corbière.

Sarnia. St. Aubin's Bay (F. V. Lester); St. Brelade's Bay, St. Ouen's (A. Ley); Grand Havre (M. Dauber); L'Ancresse Common (J. D. G.).

(1) West Cornwall. St. Martin's, Scilly (J. Ralfs); Tresco, Scilly (W. Curnow).

CHAPTER IV.

Several names other than those dealt with above have appeared in British lists. Notes on the more important of these, together with a few additional notes on the plants already described, are here appended.

V. TRICOLOR L. α HORTENSIS DC. Prodr. i. p. 303. This is simply the cultivated Garden Pansy. It is well known to have had a hybrid origin, *V. lutea* having been one parent; according to De Vries (*Species and Varieties*), this is believed to have been crossed with large-flowered wild pansies from the North of England. More recently, other non-British species have been used in hybridizing; for instance, *V. cornuta* L. The name *hortensis*, therefore, cannot be said to refer to any definite species of Pansy. When the Garden Pansy is allowed to seed itself freely the flowers produced in the succeeding generations degenerate in size. The plant then becomes *V. tricolor* L. *β degener* DC. Prodr. i. p. 303. Mr. Druce, in his *List of British Plants*, 1907, writes: "303 *tricolor* L. α *hortensis* (Schur)" but *V. hortensis* Schur, Enum. Pl. Transs. 82, is not a *tricolor* Pansy at all, but seems to be a white-flowered plant closely related to *V. odorata* L.

V. SAGOTI Jordan, Obs. ii. p. 34, does not seem to be separable by any constant characters from *V. alpestris* Jordan.

V. PAILLOUXI Jordan (Obs. ii. p. 36). This plant seems to me to be merely *V. alpestris* Jordan with a bluish tinge in the flowers, and in no way separable from *V. alpestris*.

V. MONTICOLA Jordan (Obs. ii. p. 37) requires further study.

V. FLAVESCENS Jordan (Obs. ii. p. 34). I agree with Rouy & Foucaud (Fl. de France, iii. p. 43) in making this synonymous with *V. luteola* Jordan (Pugillus, p. 27). The plant seems to differ from *V. Provostii* Jordan principally in having shorter peduncles. This is well shown in a specimen cultivated by Boreau, 29 May, 1862 (Herb. Kew.). The long peduncles of *V. Provostii* are very characteristic and I am not prepared to make *V. flavescens* and *V. Provostii* synonymous. The inclusion of the name *V. flavescens* in the London Catalogue, ed. 10, is due to my error in supposing certain British plants to be referable to *V. flavescens*.

V. BANATICA Kit. ex Roem. & Schult. Syst. v. 382. The description reads as follows:—"*V. banatica* Kitaib; caule angulato decumbenti-diffuso, foliis inferioribus cordatis, superioribus ovato-oblongis, dentato-crenatis, stipulis runcinato-pinnatifidis, corollis calycem glabrum vix excedentibus. Intermedia quasi *tricolorem* inter et *arvensem* β; statura *tricoloris*, corolla, præter calycem, *arvensis* β . . . . In Banatu ⊙."

Under *V. arvensis* the following note occurs:—"arvensis $\beta = \beta$ bicolor erecta, calycibus stipulisque ciliatis."

Viola banatica appears therefore to be intermediate between a large-flowered *tricolor*-Pansy and an *arvensis*-Pansy. Specimens so named in the Kew Herbarium, collected in 1854 and 1867, are referable to *V. variata* Jordan. The small plant from the Isle of Wight, collected by Miss C. E. Palmer and named *V. banatica* by Prof. Borbás, is possibly referable to *V. variata*, but the specimen in my herbarium is a small and apparently dwarfed one; so, indeed, are all the specimens I have seen, and I do not feel able to speak with any confidence about this plant.

V. banatica Kit. of Schultz Herb. norm. nov. sér. cent. 27, no. 2611, seems to be a tall yellow-flowered *V. Lloydii* Jordan.

V. GRACILESCENS Jordan, Obs. ii. p. 20, t. 2 B. (*V. tricolor* μ *gracilescens* DC. Prodr. i. p. 304). The plant of Jordan's figure appears to approach very closely to *V. ruralis* Jordan as described above (see p. 4 and tab. 500, fig. 4), and the suggestion was made (p. 5) that it might be found to be identical with that plant. Since writing the passage just referred to, I have seen the specimen from M. Seringe's herbarium in Herb. Kew. This plant was believed by Jordan to be identical with his *V. gracilescens* (see Obs. p. 22); it certainly approaches the plant referred to *V. ruralis* somewhat closely, but differs in being of slenderer habit and in other small characters. I am not prepared to state that *V. ruralis* Jordan and *V. gracilescens* Jordan are synonymous without further evidence.

I was therefore in error in claiming *V. gracilescens* Jordan as a British plant in the *London Catalogue*, ed. 10; the plants there intended must be referred to large-flowered *ruralis*. True *gracilescens* is a slenderer plant than *ruralis*, and smaller in all its parts except the flowers which are rather larger.

V. MENTITA Jordan ap. Billot, Anot. Fl. France et Allem. 101 (nomen). The specimen (Billot, no. 2021) which I have seen seems to be identical with the plant Billot, no. 3526, *V. ruralis* Jordan, in my own herbarium (p. 4), while a specimen from Herb. Déséglise "Cher. Grèves du Cher à St. Amand, 22 Juin, 1864" in Herb. Kew., and also a plant grown from seed from Cher by Mr. J. G. Baker in 1865, are apparently *V. subtilis* Jordan. In either case the plant seems to be referable to another previously named species.

V. TIMBALI Jordan, Pugillus, p. 22. Jordan's species was founded on plants from Toulouse collected by Timbal-Legrave. I have seen a plant in Herb. Kew. from Toulouse, collected and named by Timbal himself, but I am unable to distinguish it from *V. subtilis* Jordan.

V. CONFINIS Jordan is made by Rouy & Foucaud (Fl. de France, iii. p. 43) synonymous with *V. Provostii* Jordan. I am not in a position at present to express any opinion on this matter.

VIOLA CONTEMPTA Jordan, Pugillus, p. 24. I cannot distinguish the British plants so named by Boreau (Baker's *Plants of North Yorkshire*, No. 17, *Viola contempta* Jordan, Boreau! Culti-

vated fields, Sowerby. Coll. J. G. Baker) from *V. ruralis*. The stem is simple in the plants on this sheet in my own herbarium, whereas *V. ruralis* usually has a stem branched from the base, but Jordan's description of the stem of *V. contempta* (Pugillus, p. 24) reads "caulibus pluribus basi ascendentibus vel unico erecto," also the flowers are larger than in the usual form of *V. ruralis*; but my own specimens of *ruralis* from Wingerworth, Derbyshire, show both small and larger flowers. Specimens from Loire (whence came the plants on which Jordan founded his species *V. contempta*) in C. Martin's Pl. des Env. de Lyons, 1851, "*Viola contempta* Jord.! Pl. nov. pug. (Jord.), Champs près de Mt. Pilar (Loire), 19 Juil.," do not seem to me to agree with the British plants, which, as stated above, are rather referable to *V. ruralis*.

Viola Curtisii Forster var. Forsteri H. C. Watson, Comp. Cybele Britannica (1870), p. 487; (*Viola tricolor* L. subsp. *Curtisii* Forster, a. *Forsteri*, London Catalogue, ed. 6). This was founded on the Pansy from Braunton Burrows, *i. e.* the original *V. Curtisii* Forster (Engl. Bot. t. 2693).

Viola Curtisii Forster var. Mackaii H. C. Watson, Comp. Cybele Britannica (1870), p. 487; (*V. tricolor* L. subsp. *Curtisii* Forster, b. *Mackaii*, London Catalogue, ed. 6). This is the Portmarnock Pansy, and seems to be the same as that from New Brighton sand-hills (now extinct) which was identified by M. Jordan as *V. sabulosa* Boreau. It is a parti-coloured Pansy.

Viola Symei Baker in Thirsk Bot. Ex. Club Report, 1859, p. 8; (*V. Curtisii* Forster var. *Symei* H. C. Watson, Comp. Cybele Britannica (1870), p. 487). This is a large yellow-flowered Pansy from Mullaghmore, Co. Sligo, and perhaps also from Land's End and Crymlyn Burrows, Glamorgan (Watson, *loc. cit.* pp. 487–8). It is difficult to separate the British specimens from *V. Curtisii* Forster. The Irish plant is apparently distinct, but I am not sufficiently familiar with the plant to pronounce an opinion. The *Curtisii*-Pansies require further study, and I hope to return to this subject shortly.

Viola lutea Hudson var. hamulata J. G. Baker, Botany of North Yorkshire, p. 207; Exch. Club Report, 1865, p. 7. This Pansy is stated to bear somewhat the same resemblance to *V. lutea* that *V. arvensis* (sensu lato) bears to *V. tricolor*. It has the habit and growth of *lutea*, but bears small flowers half an inch across, the terminal lobe of the stipule is much longer than the lateral ones, and is leafy and toothed. The plant was found on Richmond Racecourse, North Yorkshire, and on Copperthwaite Moor, near Reeth. I am not familiar with the plant, the type of which was destroyed by fire in 1864 (see E. G. Baker, Journ. Bot. xxxix. (1901), p. 223). I should be very glad to hear whether it has been rediscovered.

V. subtilis Jordan and V. segetalis Jordan. It seems evident that Jordan formerly identified with his species *V. segetalis* certain plants which he afterwards distinguished by the name *V. subtilis*

(see p. 3). Thus a sheet in the Manchester Museum Herbarium labelled "*Viola segetalis* Jord.! Alex (Rhône), June, 1848. Coll. A. Jordan (Herb. E. Bourgeau, No. 10)" appears to be *V. subtilis*. *V. segetalis* was published in 1846, while *V. subtilis* appeared first in Billot's Anot. Fl. France et Allem. 1855–62. It is by no means surprising that, as Jordan's acquaintance with the pansies increased, he should have found it necessary to separate certain plants which he had not previously distinguished. This of course renders great care necessary in consulting his specimens, which should always be compared with his descriptions where such exist.

VIOLA PALLESCENS Jordan, Obs. ii. p. 10. There is a very marked similarity between Jordan's figure of *V. pallescens* (Obs. ii. t. 1 A) and *V. derelicta* Jordan (Billot, Fl. France et Germ. Exsicc. no. 2022) and our British plants so named (p. 6 and t. 501, f. 1). The upper petals in our British plants and in Billot's specimens are not particularly narrow, while those of Jordan's figure of *V. pallescens* are very narrow, widely diverging and not overlapping even at the base. In his description, however, he merely writes, "les deux supérieurs (petales) oblongs, divergents." How far the very narrow form of the petal is to be regarded as constant and specific for *pallescens* I am unable to say, as I have not had the opportunity of comparing plants actually named by Jordan. In face of his figure it is wiser not to synonymize *V. derelicta* with *V. pallescens* without further evidence (see p. 6).

V. CARPATICA Borbás. This plant is stated in Koch's Synopsis, ed. iii. p. 222 (1892), to be *V. declinata* × *tricolor α subalpina*. The plant from which I drew up the description on p. 12 had been determined by Prof. Borbás himself, and hence there can be no question as to the correctness of the naming. The hybrid character, however, seems to be less clear. Mr. E. G. Baker stated in Journ. Bot. xxxix. (1901), p. 10, "*V. declinata* W. & K. has not been recorded as British," and this remark still holds good. I have seen several specimens which I was inclined to regard as *V. declinata*, but a careful comparison with the original description and figure (Waldst. & Kit. Plant. Rar. Hung. iii. p. 248, t. 223) has led me to the conclusion that the British plants are not so referable, as all have more or less hairy stem and ciliate leaves, while in the description of *declinata* it is stated:—"tota planta exceptis stipularum ciliis glabra lævis." Moreover, the Cockerham Moss plants determined by Prof. Borbás as *V. carpatica* do not show any of the characters which experience has led me to associate in my mind with hybrid origin (see p. 17). Thus our British plants of *V. carpatica* do not appear to be of hybrid origin, but of pure ancestry.

CHAPTER V.

CLASSIFICATION.

I shall here deal only with the system propounded by MM. Rouy & Foucaud (Flore de France, iii. 1896), and with that of Mr. E. G.

Baker (Journ. Bot. xxxix. 1901); the former system will be considered only in so far as it relates to British plants.

It must be noted in the first place that MM. Rouy & Foucaud use the term "forme" with a special signification. Writing of this term they remark (vol. i., introduction, p. xi):—"La *forme* . . . nous considérons ici comme synonyme de la *race* en horticulture, et non comme une simple variation ou modification peu importante du type spécifique, due à des changements dans les conditions ordinaires de la vie de la plante, ce qui constitue alors le variété. Nous estimons donc la *forme* d'un degré supérieur dans l'échelle de la classification à la variété. . . ."

It must be noticed that the *forme* is in every case an *aggregate*, and the varieties under it are segregates—that is to say, the *forme* is completely made up by its varieties or segregates. Their system, in so far as it concerns British plants, may be summarized in the following table:—

VIOLA TRICOLOR L.

Forme (aggregate) *V. hortensis* DC. (pro var.).
Forme (aggregate) *V. saxatilis* Schmidt (pro sp.).
  α (segregate) *alpestris* Jord. (pro sp.).
  ζ (segregate) *lepida* Jord. (pro sp.).
  η (segregate) *Provostii* Boreau (pro sp.).
Forme (aggregate) *V. arvensis* Murray (pro sp.).
  α (segregate) *segetalis* Jord. (pro sp.).
  β (segregate) *Lloydii* Jord. (pro sp.).
  δ (segregate) *variata* Jord. (pro sp.).
  ζ (segregate) *Deseglisei* Jord. (pro sp.).
  η (segregate) *agrestis* Jord. (pro sp.).
  θ (segregate) *ruralis* Corb.
  κ (segregate) *obtusifolia* Jord. (pro sp.).
  λ (segregate) *arvatica* Jord. (pro sp.).
  ν (segregate) *subtilis* Jord. (pro sp.).
Forme (aggregate) *V. Kitaibeliana* Roem. et Schultes.
  β (segregate) *derelicta* Jord. (pro sp.).
  γ (segregate) *nana* DC.
Subspecies (aggregate) *V. Curtisii* Forst. (pro sp.).
  α (segregate) *genuina* Rouy & Foucaud.
  β (segregate) *Pesneaui* Rouy & Foucaud.
  γ (segregate) *sabulosa* Rouy & Foucaud.
Subspecies (aggregate) *V. lutea* Huds.
  α (segregate) *unguiculata* Rouy & Foucaud.
    s. var. *violacea* Rouy & Foucaud.
    s. var. *lutea* Rouy & Foucaud.
  γ (segregate) *multicaulis* Koch.

(In quoting authorities in this list I have followed Rouy & Foucaud.)

As we have already seen, "forme *hortensis* DC." is merely the garden Pansy.

The aggregate *V. saxatilis* (Schmidt) is defined thus: "Diffère du *V. hortensis* par sa corolle plus petite, non tricolore, à pétales

non veloutés, à peine une fois plus longs que les sépales." No stress is laid on the perennial nature nor on the long spur, but the segregate is made to include those plants which are referable to the group *Saxatiles* in my own system.

The aggregate *V. arvensis* (Murray) is defined thus: "Plantes annuelles à racine grêle, non cespiteuses; fleurs médiocres à pétales non veloutés égalant environ les sépales ou les dépassant un peu, rarement plus courts." No emphasis is laid on the actual size of the flowers, and hence the large-flowered *V. Lloydii* Jordan and *V. variata* Jordan are included in this set, in spite of the fact that *V. arvensis* was founded upon small-flowered plants.

The subspecies (aggregate) *V. Kitaibeliana* Roem. et Schultes is defined thus: "Diffère du *V. arvensis* par les fleurs petites ou très petites, à pétales courts n'égalant ordinairement pas le calice, ou rarement le dépassant à peine; plantes généralement basses, à racine grêle, ténue." The two British plants included are certainly unnaturally associated, their only resemblance lying in the possession of very minute flowers. *V. derelicta* Jordan is obviously a small *arvensis*-pansy, while *V. nana* seems to find a very natural position in close association with *V. parvula* Tineo Pug. rar. pl. Sic. p. 5 (exsicc.:—G. Rigo, Iter Italic. quart. ann. 1898, No. 432), a plant found in Spain, Sicily, Greece, Crete, Asia Minor, North Africa, and the Canaries.

The subspecies (aggregate) *V. Curtisii* Forster is equivalent to my group Curtisieæ, and the segregate *α genuina* Rouy & Foucaud is the original *V. Curtisii* Forster of Braunton Burrows (*V. Curtisii* Forster, var. *Forsteri* H. C. Watson).

The subspecies (aggregate) *V. lutea* Huds. is nearly equivalent to my group Luteæ, except that it includes var. *multicaulis* Koch, which I have removed from here and placed in the group Saxatiles. Var. *unguiculata* Rouy & Foucaud seems to be for the most part equivalent to *V. lutea* Huds. var. *grandiflora* Koch, and to the British plant described on pp. 12–13 of this paper (*cf.* E. G. Baker, Journ. Bot. xxxix. (1901), p. 222). Further subdivision results in the separation of subvars. *lutea* and *violacea*, the former including the yellow-flowered and the latter the blue-flowered forms (var. *amœna* Henslow).

To the *Journal of Botany*, xxxix. (1901), Mr. E. G. Baker contributed two papers dealing with the British pansies. In the first (pp. 9–12) he recognized as British *V. Curtisii* Forster and *V. Pesneaui* (quoted as of Lloyd & Foucaud), and from Ireland *V. Symei* Baker; and also *V. nana*, Corbière, from the Channel Isles and Scilly. In the second paper (pp. 220–227) he gives by far the best account of the British perennial upland pansies hitherto published. He makes two groups, and for the most part he emphasizes what appear to be the really important characters, the perennial habit of the plants in Group II. (corresponding to my group Saxatiles) being recognized as of primary importance. In the characterization of the stipules in this group, however, I cannot entirely agree with him.

He recognizes the following plants as British:—

"Group I. Representative species, *V. lutea* Huds."

V. lutea Huds.
Var. *amœna* Henslow.
subvar. *insignis* E. G. Baker.
Var. *hamulata* J. G. Baker.

"Group II. Representative species, *V. saxatilis* Schmidt (*V. alpestris* Jordan)."

V. Provostii Boreau.
V. monticola Jordan.
V. Sagoti Jordan.
V. Paillouxii (sic) Jordan.
V. lepida Jordan.
V. carpatica Borbás.

Notes on *V. lutea* var. *hamulata* and *V. Sagoti* will be found on pp. 25 and 27–28; as stated on p. 25 *V. monticola* demands further study.

Mr. E. G. Baker's work was extremely valuable in bringing into order the confused mass of information relating to the British pansies.

In the present paper I have used a somewhat different method of subdivision. The aggregate "forme" *V. arvensis*, adopted by Rouy & Foucaud, is divided by the extraction of the large-flowered *V. Lloydii* and *V. variata*, which, together with *V. cantiana*, are made to constitute a new group TRICOLORES, the small-flowered species alone being left in the group ARVENSES, under which is also placed *V. derelicta*, from Rouy & Foucaud's aggregate "forme" *V. Kitaibeliana* R. & S. The group SAXATILES includes all the British representatives of Rouy & Foucaud's aggregate "forme" *V. saxatilis* Schmidt, together with *V. macedonica* Boiss. & Heldr., *V. polychroma* Kerner, and *V. carpatica* Borbás, plants not included in their system, and *V. lutea* γ *multicaulis* Koch * (*V. calaminaria* Lej.) which I have taken out of their aggregate subspecies *V. lutea* Huds. The aggregate "forme" *V. Kitaibeliana* I do not recognize; *V. derelicta* Jordan has been transferred to the group ARVENSES, while *V. nana* Corb. has been placed in a new group NANÆ.

Goup IV. LUTEÆ includes only *V. lutea* Huds. and the new var. *Murrayi*, while Group V. CURTISIEÆ corresponds to the aggregate subspecies *V. Curtisii* Forster, as used by Rouy & Foucaud.

The British list now stands as follows:—

Group I. ARVENSES.

1. *V. agrestis* Jordan.
2. *V. segetalis* Jordan.
3. *V. subtilis* Jordan.
4. *V. Deseglisei* Jordan.
5. *V. obtusifolia* Jordan.
   × "*hortensis*."
6. *V. ruralis* Jordan.
   var. *glabra* Drabble.
7. *V. arvatica* Jordan.
8. *V. derelicta* Jordan.

* See footnote on p. 23.

Group II. Tricolores.

9. *V. Lloydii* Jordan.
   × "*hortensis*."
   var. *insignis* Drabble.
10. *V. variata* Jordan.
    var. *sulphurea* Drabble.
11. *V. cantiana* Drabble.

Group III. Saxatiles.

12. *V. macedonica* Boissier & Heldrich.
13. *V. alpestris* Jordan.
14. *V. lepida* Jordan.
15. *V. polychroma* Kerner.
    × *Lloydii*.
16. *V. Provostii* Boreau.
17. *V. calaminaria* Lej.*
18. *V. carpatica* Borbás.

Group IV. Luteæ.

19. *V. lutea* Hudson.
    var. *Murrayi* Drabble.

Group V. Curtisieæ.

20. *V. Curtisii* Forster.
21. *V. Pesneaui* E. G. Baker.
22. *V. sabulosa* Dumort.

Group VI. Nanæ.

23. *V. nana* Corbière.

In conclusion, I desire to express my sense of indebtedness to many friends and correspondents who have been of the greatest assistance in lending specimens and collecting plants. In an especial degree is my gratitude due to Mr. James Britten for his great help with the nomenclature; without his assistance the publication of the paper would have been impossible; also to Mr. E. G. Baker, to whom I owe my first acquaintance with the British pansies; to Mr. T. A. Sprague for his kindness in many ways; and to the authorities at the Natural History Museum and at Kew for permission to consult the extensive collections in these institutions, and for the facilities afforded to me while working there.

No one can be more sensible than the author that there are manifold imperfections in this paper, but it is hoped that something has been done to further the study of the British Pansies.

Addenda et Corrigenda.—P. 12, line 5 from foot, read: "Hudson, Fl. Angl. p. 331 (1762): E. Bot. t. 721 (1800)." P. 11, line 7 from foot, instead of "Viola multicaulis" read "Viola calaminaria Lejeune, Rev. fl. Spa, 49." P. 16, line 5 from foot, instead of "*multicaulis*" read "*calaminaria*."

Explanation of Plates.

Tab. 500.—(1) *Viola Deseglisei* Jordan, upper plant from Wallasey, Cheshire, July, 1907; lower plant from Pentire, Cornwall, Aug. 1907. (2) *Viola obtusifolia* Jordan, from Rednall, Shropshire, June, 1891. (3) *Viola agrestis* Jordan, from Truro, July, 1907. (4) *Viola ruralis* Jordan, from Thirsk, Yorkshire, May, 1865 (Billot exsicc. Fl. Gall. et Germ. no. 3526). (5) *Viola segetalis* Jordan from Truro, July, 1907.

Tab. 501.—(1) *Viola derelicta* Jordan. Plant on left from Linacre, Derbyshire. July, 1907; plant on right from Glen Muick, South Aberdeen, July, 1907. (2) *Viola subtilis* Jordan, from Cobham, Kent, June, 1903.

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* See footnote on p. 23.

LINNÆUS'S *FLORA ANGLICA*.

Introductory Note.

[Among the many obscure works which have been brought into prominence in connection with recent researches into questions relating to nomenclature, the *Flora Anglica* of Linnæus is of special interest to English botanists. The work is rare and not easily accessible, and it is thought that a reprint may be useful.

As long ago as 1881, R. A. Pryor called attention in this Journal (p. 74) to this *Flora* as put forth in vol. iv. (pp. 88–111) of the *Amœnitates Academicæ* (1759) and pointed out that certain received names were first published in this work. He was not aware, however, that this was not the earliest publication of the *Flora*, which was first issued, independently, in 1754. A comparison of the original with the reprint in the *Amœnitates* shows important differences between them—indeed, the trivial names which claim recognition are not to be found in the original publication. In his note (*l. c.*) Pryor, speaking of the name *Hypericum elodes*, which he attributes to Hudson, says: "This is to be found as a *solum nomen*, together with several others that were previously unpublished, in the catalogue of the *Flora Anglica* put forth in Grufberg's name in the fourth volume of the *Amœnitates Academicæ*. These names, though referred throughout to the numbers of the Dillenian edition of [Ray's] *Synopsis*, have never been taken up, and only one of them—*Veronica montana*—has been noticed in this relation by Richter in the *Codex Linnæanus*." It will of course be evident that the case cited cannot be considered as a *solum nomen*, as the mention of the page of the *Synopsis* and the number borne by the plant on the page ("344–8") supplies the "reference to a former description under another name" which is sufficient for valid publication.

Pryor (*l. c.* 75) gives a list of five names, in addition to *Hypericum elodes* and to *Veronica montana*, which he considers as dating from the *Amœnitates* (1759); but of these only two can claim to be so reckoned. *Veronica montana* was previously published by Linnæus (Cent. Plant. i. 3 (1755)); *Primula acaulis*, *Medicago minima* and *Ophrys arachnites* were not intended to represent species but varieties. It may be well to give here the note establishing this position which appeared in Journ. Bot. 1907, 434:—"A careful consideration of this list of plants has convinced us that the names contained therein must be regarded as bearing the same rank as they do in the *Species Plantarum*. Where a species in the latter contained varieties which occur in the

British flora, the species-name is introduced only with the first variety, *e. g.*:—

Medicago polymorpha arab. *minima.*

Primula veris officin. *acaulis.* . . .

A comparison with the *Species Plantarum* shows that Linnæus always inserted varieties in the *Flora Anglica* in this way—that is, without repeating the species-name. We should read the references in *Flora Anglica* as *P. veris* [var.] *elatior*, *P. veris* [var.] *acaulis*, &c. A further proof is found in the fact that in *Species Plantarum*, ed. 2, which was later than the *Flora Anglica* (1754), these names occupy the same rank as in ed. 1, *i. e.* appear as varieties. It is absurd to suppose that Linnæus in 1754 raised to the rank of species plants which a year before he had considered varieties, to which rank he again reduced them in 1762; yet on no other supposition can these names be regarded as of specific rank. An interesting confirmation is found in the method of citation under *Trifolium* of the species of the section *Melilotus*: thus in the *Flora Anglica* Linnæus has

Trifolium Melilotus offic.
Ornithopodioid.

Here, as in the previously cited cases, he omits the repetition of the middle word; the citation in full is *Trifolium Melilotus Ornithopodioides*. We assume that no one would quote this as *T. Ornithopodioides* L."

Trifolium medium may be added to Pryor's list, making four species—the others being *T. squamosum* (*maritimum* Huds.), *Vicia angustifolia*, and *Hypericum elodes*—found on the same page (105) of Amœn. Acad. iv. (1759). Of these only one—the *Vicia*—is quoted from this, the first place of publication, in the *Index Kewensis*; the *Hypericum* and *Trifolium medium* are attributed to Hudson, and *T. squamosum* is altogether omitted.

In the following reprint it has been found possible to combine the two editions. The body of the text is the list as it appeared independently in 1754; the additions or alterations in square brackets [ ] indicate the differences which were made in the 1759 reprint in the *Amœnitates*—one or two such alterations will also be found in the introductory observations. Names in curved brackets ( ) occur only in the first edition; these are practically confined to the "Dubia," many of which were in the second edition relegated to their right position in the list. The references in the "Dubia" ("Obscuræ" of second edition) are to the Bauhins, Petiver, Plukenet, and Dillenius. The names printed in italics are of plants which were not known to occur in Sweden. It has not been thought necessary to add the equivalents of the names in present-day nomenclature; most of these will be obvious at a glance, the remainder can be determined by a reference to Ray's *Synopsis*, ed. 3, the page of which is always given; in the "Dubia" it precedes the name. The title-page is that of the first edition. We are indebted to Mr. W. R. Clarke for the transcription of the *Flora*.—Ed. Journ. Bot.]

D. D.

FLORA ANGLICA,

QUAM

CUM CONSENS. EXPERIENT. FAC. MEDICÆ
IN REGIA ACADEMIA UPSALIENSI,

SUB *PRÆSIDIO*

VIRI NOBILISSIMI ATQUE *EXPERIENTISSIMI,*

DN. DOCT. CAROLI LINNÆI,

S:Æ R:Æ M:TIS ARCHIATRI, MED. ET BOT. PROFESS.
REG. ET ORD. ACAD. LONDIN. SOCII,
Nec non
EQUITIS AURATI DE STELLA POLARI.

SPECIMINIS ACADEMICI LOCO
PUBLICÆ VENTILATIONI OFFERT

ISAACUS OLAI GRUFBERG,
STOCKHOLMIENSIS.

IN AUDITORIO CAROLINO MAJORI D. III. APRIL
ANNO MDCCLIV.
H. A. M. C.

UPSALIÆ,
Exc. LAUR. MAGNUS HÖJER, Reg. Acad. Typogr.

Caput Primum.

Scientia Botanices est illa pars Philosophiæ Naturalis, quæ propter plantarum infinitatem varietatem, odore, sapore, colore & structura omnium oculos allicit, & propter multiplicem plantarum usum in arte Medica, Oeconomica & Vita Communi, omni fere exculta fuit ævo.

Recentiori ævo ob has rationes etiam *Professiones Botanicæ* cum *Hortis*, infinita facile plantarum varietate superbientibus, ad præstantissimas Europæ Academias sunt ab Imperantibus institutæ, ut scientia amœnissima simulque utilissima late per regna disseminaretur, faciliusque addisceretur in usum & oblectamentum commune.

Successit hoc institutum felicissime, ut non modo plures eruditi in hac arte evaserint, quam ullo antea tempore, sed etiam ut artis gnari, per plerasque regiones Europæ, sponte nascentes plantas investigaverint & enumeraverint in Libellis *Floris* dictis, quibus docemur de plantis cujusvis regionis propriis aut communibus; Unde etiam ingens copia plantarum rariorum hodie evasit detecta & notissima.

Ejusmodi *Floræ*, ut Compendia, ita haud parvo quidem sunt subsidio incolis, aliisque, qui intra ejusdem regionis plagas degunt, plantasque istius terræ sibi familiares redere gestiunt; Deinceps, in illis itidem videre licet, quasnam & quam diversas quævis terra gignat producatque plantas, pro ratione *situs* atque *soli*, unde, uti Regionum, ita & plantarum mutua & haud parva differentia originem trahat sui.

Circa ejusmodi *Floras* dolent plurimi, quod eædem plantæ a diversis Auctoribus sint indigitatæ nominibus sæpe diversissimis, cum aliis placuerit hujus Auctoris, aliis vero alterius nomina adhibere, ut hæc nomina non ab aliis, quam qui vel instructissima Bibliotheca Botanica sunt instructi, vel etiam longa experientia in arte demum evasere doctissimi facile intelligentur.

Mecum consentientes hac in re certe habebo, quotquot carent rarissimo libro Petiverii *Herbario Britannico* dicto, quo destitutus plurimas plantas Anglicas seponere debui.

Huic morbo facile mederentur artis periti, si omnes *Floræ* iisdem nominibus proponerentur, circa easdem plantas, tamquam communi lingua, ne opus esset unicuique ob novam & diversam *Floram* evolvere Synonyma, & quasi e novo artem addiscere, sed dignoscerentur æque facile nomina ac individua ejusdem speciei plantarum.

Glaciem igitur in hac parte Botanices soluturus, Floram Anglicam, in se perquam prolixam, succincte explicandam suscepi, modo, quo omnes exoptavi Floras propositas; quod enim si fieret cum reliquis Europæ Floris, nullus sane dubitarem, quin longe luculentiori luce illucesceret tandem *Botanice*.

Quod ad obtinendum inceptum, eo breviorem inveni viam, quo longe compendiosiora aptioraque nobis porrigant *Species plantarum*, nuper editæ, nomina Trivialia, quæ juxta plantas non modo definitas, sed & selectioribus Synonymis adornatas, offendimus; quo ipso non tantum dubia de planta quæstionis sæpissime

profligantur, sed etiam definitiones, ob novas plantas interdum mutandæ, nullæ obicem ponunt.

Brevitatis causa, etiam ad quodlibet *nomen triviale* adposui *numerum paginæ & paragraphi* [*e Raji Synopsi stirp. Britanniæ, edit. 3 : iæ*]; ut si quis desideraret harum plantarum locum natalem proprium, aut aliud quid, ut e. gr. Synonyma, Observationes &c. facilius ipsum librum evolvat.

Plantas has anglicanas enumeravi secundum *systema sexuale*, ut Commilitones concives facilius *Floram Anglicam* cum *Svecica* conferre queant, & inde perspiciant discrimen, quod *Anglicanas* & *Svecicas* intercedit, quodque ut eo facilius obtineretur, Species illas Plantarum, quæ sponte, nostra hac in SVECIA, non inveniuntur, literis minusculis, quæ communiter alioquin nominantur *literæ Cursoriæ*, exaravi; Unde mox patebit ducentas circiter species plantarum, in ANGLIA sponte nascentes dari, quæ per *Sveciam* nuspiam occurrunt; totidem etiam in SVECIA, quæ in *Anglia* non sint obviæ.

Muscos & Fungos quoque prætermisi, nimiæ prolixitatis evitandæ gratia, quippe cum plerique *Musci Dilleniani* in Anglia reperiantur, ut &, cum *Fungi* ob infinitam varietatem mutabilitatemque suam hoc tempore difficulter determinentur.

CEREALES plantas, quas uti spontaneas Floræ suæ inseruit Rajus, jure omni exclusi, cum hæ omnino sint extraneæ, uti *Hordeum*, *Triticum*, *Secale*, *Avena*, *juglans*.

CAPUT SECUNDUM.

BRITANNIÆ nomine continentur *Anglia*, *Scothia* atque *Hibernia*, quæ sunt insulæ, sitæ in Oceano Atlantico, intra 50 & 61 gradus in latitudine, & intra 12 & 19 gradus in longitudine; porrigitur ergo BRITANNIA, a plaga boreali ad frigidas, & a Meridionali, ad calidas EUROPÆ regiones, quo ipso efficitur, ut varia tamque diversa vegetabilia in Anglia crescere seu vigere possint. Nimirum, tum illa, quæ communiter in Meridionalibus, tum etiam illa, quæ in EUROPÆ Septentrionalibus nascuntur. Præterea, cum hæc terra undique circumdetur mari, ita major inibi reperitur copia plantarum *Marinarum* atque *Maritimarum* quam ulla in alia regione EUROPÆ.

Anglia hæc constat partim sylvis & nemoribus, partim campis & apricis, & heic præcipue locorum occurrunt varii campi & monticuli CRETACEI, quos circa variæ etiam plantæ terram amantes siccam; humidam vero, atque putridam prorsus respuentes, crescunt, ut e. gr. *Hedysarum*, *Hippocrepis*, *Reseda*, *Rubia cynanchica*, *Verbena*, &c.

De cætero dantur etiam hisce in Regionibus variæ altissimæque ALPES, quæ per altitudinem loci, & perennem nivem, plantas producunt *Alpibus* proprias, quales sunt in WALLIA Snowdon & Caderidin, in JORCKSCHIRE Ingleborough, Hardknot, nec non in ARRONIA, WESTMORLANDIA, ut & in SCOTHIA Betaik, atque in HIBERNIA Maugarton & Sligo, quibus in locis diversæ plantæ mere *Alpinæ*, ut: *Saxifragæ*, *Rhodiola*, *Papaver*, *Serratula*, *Dryas*, *Arbutus*, *Alchemilla*, *Sibbaldia* aliæque se sistunt.

Hæc regio præstat cuilibet alii multitudine specierum *Menthæ*, plurimisque gaudet *Euphorbiæ* speciebus. Nonnullæ etiam heic occurrunt plantæ, in aliis terris EUROPÆIS perquam raræ, ut: *Potentilla fruticosa*, *Sibthorpia* [*europæa*], *Dianthus glaucus*, *Cistus surrejanus*, *Bartsia viscosa*, [*Erica cantabrica*], *Sisymbrium monense*, *Mentha piperita* [*Euphorbia portlandica*, *Smyrnium cornubiense*, *Lychnis dubrensis*, *Polypodium cambricum*, *Trichomanes tunbringensis*].

Gnaphalium margaritaceum [& *Dactylis cynosyroides*], incola alias AMERICÆ septentrionalis, in Anglia jus civitatis obtinuerunt.

CAPUT TERTIUM.

Differunt imprimis Plantæ SUECICÆ ab ANGLICANIS.

I:o, Quod longe plures plantæ ALPINÆ per *Lapponiam Sueciæ* occurrant, quam in alpibus *Britannicis*. E. gr.

Saxifraga	Andromedæ	Lychnis	Tussilago
Pediculares 3	Violæ 2	Astragalus	Sonchus
Azaleæ 2	Betula	Phaca	Ophrys
Junci 2	Diapensia	Arabis	Rubus
Ranunculi 3	Veronica	Erigeron	

II:o, Quod plures etiam, nescio quam ob causam, plantæ NEMOROSÆ in *Svecia* se sistant, quam per *Angliam* e. gr.

Acer platanoides [*platanoides*]	Anemone Hepatica [*Hepatica*]
Fumaria bulbosa [*bulbosa*]	Orobus vernus [*vernus*]
Pulmonaria officinalis [*officinalis*]	Dentaria bulbifera [*bulbifera*]

III:o, Quod Plantæ plures CAMPESTRES *Arenariæ* & *Apricæ* in *Svecia* sponte occurrant, quam in *Anglia*

Lonicera Xylosteum	Mespilus Cotoneaster
Asclepias Vincetoxicum	Arbutus Uva ursi
Laserpitium latifolium	Orobus niger
Trifolium montanum	Androsace septentrion.
Anchusa officinarum	Alysson incanum

IV:o, Quod Plantæ pauciores MARINÆ & *maritimæ* in *Svecia*, quam in *Anglia* hucusque detectæ sint.

Convolvulus Soldanella	Polygonum maritimum
Beta vulgaris	Artemisiæ mon. var. [maritimæ variæ]
Crithmum maritimum	Inula crithmoides
Frankenia pulverulenta	

V:o, Plantæ in terra CRETACEA nascentes sæpe exulant in *Succia*, ubi *Creta* vix occurrit, contra vero in *Anglia*, ubi colles cretacei frequentissimi.

CAPUT QUARTUM.

Initio proxime præcedentis Seculi, putabant *Botanici* nationem *Anglicanam* minus aptam, immo, prorsus alienam esse a *Studio*

Botanices; exitus vero ejusdem seculi contrarium satis superque probabat, dum plures in *Anglia*, quam alias per totam *Europam* uno eodemque tempore exorti sunt *Botanici*, qui tam multas tamque varias detegebant plantas, tam per *Britanniam*, quam per *Indias* nascentes, ut universus terrarum orbis literatus horum indefessum studium & Rei herbariæ peritiam admiraretur. Quod qui *Raji*, *Morisoni*, *Bobarti*, *Plukeneti*, *Petiveri* aliorumque scripta evolvit, adeo ex omni parte sufficienter demonstratum comperiet, ut nil supra.

Rajus (*Johannes*) *Collegii trinitatis Canhabrigensis* Socius, erat inter primos, qui Botanicen infinita industria heic loci excoluit, cujus rei testes *Historia* ejus *plantarum* trium voluminum in folio, & *Observationes* ejus *Topographicæ* sunt claræ & invincibiles.

Ille primo aggressus est, plantas circa Canthabrigiam nascentes indagare, quas edidit in *Catalogo Plantarum* circa *Canthabrigiam nascentium Canthabr. A:o 1660 in 8:vo.* Una cum appendice *A:o 1663, & 1685.* Quo circa non dum adquiescebat, sed ulterius cœpit, omnes in Anglia nascentes colligere plantas, atque primam *Floram Anglicam* edidit, sub titulo; *Catalogi plantarum Angliæ & Insularum adjacentium. Lond: A:o 1670 & 1677 in 8:vo.* auctam.

Altera ejus *Flora: Synopsis methodica stirpium Britannicarum* dicta, adhuc magis aucta, *Lond. 1690 & 1696 in 8:vo*, 250 herbis ditata est.

Post obitum *Raji*, edita fuit hæc *Flora Britannica* tertia vice, opera *Joh. Jac. Dillenii* sub nomine; *Synopsis methodicæ stirpium Britannicarum editionis 3:iæ. Lond. 1724 in 8vo.* Tabulis 24; aucta 450 speciebus.

Recentior hæc *Flora*, omnium Florarum usque ad hunc diem existentium habetur perfectissima, quippe cum nulla alia, majori diligentia seu plurium unanimi studio collecta & enucleata sit; in ea enim reperiuntur, non modo quæ *Rajus* ipse indefesso labore investigare potuerit, verum etiam quæ *Petiverus*, *Plukenetius*, *Morisonus*, *Bobartus*, *Sloane*, *Sherardus*, *Dillenius*, *Dale*, *Rand*, *Buddle*, *Doody*, *Lawson*, *Lhwyd*, *Newton*, *Stonestreet*, *Camden*, *Brown*, *Vernon*, *Nicholson*, *Robinson*, [*Jonson*], *DuBois*, *Manningham*, *Richardson*, *Sibbald* observaverint; Quorum *Plukenetius*, *Sherardius*, *Richardson & Dillenius* primum merentur locum.

Caput Quintum.

Ultima hæc *Flora*, ea præcise est, quam mihi jam adsumsi enucleandam, etenim ut ut pleræque plantæ facile extricari possunt, occurrunt tamen non paucæ, quæ omni illa opera, quam Botanici Angliæ navarunt, adhuc dum obscuriores certe mihi persistunt; imprimis cum Herbario Petiveriano destituor, idque maxime in Graminum familia intricatissima, quam ob causam necesse etiam habui, has ad finem hujus dissertatiunculæ proponere, certa spe fretus, Botanicos hodiernos Angliæ, eas proprias introspectas, Characteribus suis a Congeneribus distinctas posituros, quo ipso Botanices pomeria extenduntur & Regionis Historia Naturalis illustratur. Sententiam enim de non visis plantis ferre, nixum

dubiis Auctorum testimoniis, nimis periculosum esse satis superque inter omnes constat, quippe cum persæpe inde contingat, ut varietates loco distinctarum specierum obtrudantur, & contra species pro varietatibus sumantur.

Classis I. MONANDRIA.

Monogynia.

Salicornia europ. 136–1
fruticos. 136–2
Hippuris vulgaris 136–1
[Callitriche autumnalis 290–3
verna 289–1]

Classis II. DIANDRA.

Monogynia.

Ligustrum vulgare 465–1
Circæa lutetiana 289–1
Veronica spicata 279–2
officinalis 281–13
hybrida 279–1
serpyllifolia 279–3
Beccabunga 280–8
Anagallis ▽ 280–9
scutellata 280–10
Chamædrys 281–11
[*montana* 281–12]
agrestis 279–4
arvensis 279–5
hederifolia 280–7
triphyllos 276–6
Pinguicula vulgaris 281–1
villosa 281–1
Utricularia vulgaris 286–1
minor 286–2
Verbena officinalis 236–1
Lycopus europæus 236–1
Salvia pratensis 237–1
verbenaca 237–1

Digynia.

Anthoxanthum odorat. 398–1 [4]
[Bufonia *tenuifolia* 346–1]

Classis III. TRIANDRIA.

Monogynia.

Valeriana officinalis 200–1
dioica 200–3
Locusta 201–1
Iris Pseud-Acorus 374–1
fœtidissima 375–3
Schœnus Mariscus 426–4
nigricans 430–10
Schœnus [*ferrugineus* 430–9]
[*compressus* 425–14]
albus 427–6
Cyperus *longus* 425–1
Scirpus palustris 429–7
acicularis 429–8
fluitans 431–12
lacustris 428–1
Holoscœnus 429–6
mucronatus 429–5
setaceus 430–11
cespitosus [cæspitosus] 429–9
sylvaticus 426–5
maritimus 426–3
Eriophorum polystachion 435–1
vaginatum 436–2
Nardus stricta 393–2
(*articulata* 395–3)

Digynia.

Panicum *glaucum* 393–1
sanguinale 399–2
Crus galli 394–1
Dactylon 399–1
Phalaris phleoides 398–2
arundinacea 400–1
Phleum pratense 398–1
[nodosum 398–3]
arenarium 398–4
Alopecurus pratensis 396–1
geniculatus 396–2
Milium effusum 402–1
Agrostis spica venti 405–17
rubra 394–4
stolonifera 402–2
Aira cærulea 404–8
cristata 396–3
aquatica 402–3
cespitosa [cæspitosa] 403–5
canescens 405–16
precox [præcox] 407–10
flexuosa 407–9
caryophyllea 407–7
Melica nutans 403–6
Poa aquatica 411–13

Poa pratensis 409–3
angustifolia 409–4
trivialis 409–1
annua 408–1
[*compressa* 409–5]
rigida 410–8
Briza media 412–1
minor 412–2
Dactylis glomerata 400–2
cynosuroides 393–4
Cynosurus cristatus 398–2
echinatus 397–5
cœruleus 399–4
paniceus 394–3
Festuca ovina 410–9, 11
duriuscula 413–4
decumbens 408–11
fluitans 412–17
[marina 395–4]
amethystina
[amethistina] 411–16
myurus 415–12
bromoides 415–13
Bromus secalinus 414–8
arvensis 413–5
sterilis 412–1
tectorum 414–7
pinnatus 392–1
giganteus 415–11
Stipa *pennata* 393–3
Avena fatua 389–7
spicata 405–1
flavescens 407–5
elatior 406–3–4
Arundo phragmites 401–1
calamagrostis 401–2
arenaria 393–1
Lolium perenne 395–2
annuum [temulentum] 395–1
Elymus arenarius 390–1
Triticum repens 390–1
caninum 390–2
Hordeum murinum 391–1

Trigynia.

Montia fontana 352–1

Classis IV. TETRANDRIA.

Monogynia.

Dipsacus *fullonum* 192–1, 2
pilosus 192–3
Scabiosa arvensis 191–1
columbaria 191–2
Succisa 191–3
Sherardia arvensis 225–1
Asperula odorata 224–1
Cynanchica 225–1
Galium palustre 224–2
uliginosum 225–3
verum 224–1
Mollogo [Mollugo] 223–1
? boreale 224–3
Aparine 225–1
parisiense 225–4
Rubia tinctorum 223–1–2
Plantago major 314–1–2
media 314–3
lanceolata 314–5
maritima 315–7
Coronopus 315–8
? *Læflingii* 316–10
uniflora 316–11
Sangvisorba officinar:
[officinal.] 203–2
Cornus sangvinea 460–1
herbacea [svecica] 261–1
Alchemilla vulgaris 158–1
alpina 158–2

Digynia.

Aphanes arvensis 159–1
(Bufonia *tenuifolia* 346–1)
Cuscuta europæa 281–1

Tetragynia.

Ilex *Aquifolium* 466–1
Potamogeton natans 148–1
lucens 148–2
perfoliatum 149–4
serratum
[*serratum*] 149–6
crispum 149–7
compressum 149–8
[marinum 150–13]
gramineum 149–9–10
pusillum 150–15
Ruppia maritima 134–1
Sagina *erecta* 344–1
procumbens 345–2

Classis V. PENTANDRIA.

Monogynia.

Myosotis scorpioides 229–1–4
Lithospermum officinale 228–1

Lithospermum arvense 227–3
purpuro cærul. 229–2
Anchusa *sempervirens* 227–2
Cynoglossum officinale 226–1
Pulmonaria angustifolia 226–1
maritima 228–4
Symphytum officinale 230–1
Borago *hortensis* [*officinalis*] 228–1
Asperugo procumbens 228–1
Lycopsis arvensis 227–1
Echium vulgare 227–1
Lycopsis 227–2
Primula veris officinal. 284–3
elatior 284–2
acaulis 284–1
farinosa 285–1
Menyanthes trifoliata 285–1
Nymphoides 368–2
Hottonia palustris 285–1
Lysimachia vulgaris 282–1
thyrsiflora 283–3
Nummularia 283–1
nemorum 282–5
Anagallis arvensis 282–1
Convolvulus arvensis 275–2
sepium 275–1
Soldanella 275–5
Polemonium cœruleum 288–1
Campanula latifolia 276–1
Trachelium 276–2
glomerata 277–3
patula 277–4
rotundifolia 277–5–6
hederacea 277–7
Speculum ♀ 278–1
Phyteuma *orbicularis* 278–1
Samolus valerandi 283–1
Lonicera Periclymen. 458-1–2
Verbascum Thapsus 287–1
[*phlomoides* 287–2]
Lychnitis 287–3
nigrum 288–4
Blattaria 288–1
Datura Stramonium 266–1
Hyoscyamus vulgaris 274–1
Solanum nigrum 265–4
Dulcamara 265–1–2
Rhamnus catharticus 466–1
Frangula 465–1
Evonymus europæus 468–1

Ribes rubrum 456–1
alpinum 456–2
nigrum 456–4
Hedera helix 459–1
Illecebrum *verticillatum* 160–1
Glaux maritima 285–1
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Carpinus Betulus 451–1
Corylus avellana 439–1

Monadelphia.

Pinus Abies 441–2
? sylvestris 441–2
? Picea [? *Picea*] 441–1

Syngenesia.

Bryonia alba 261–1–2

Classis XXII. Diœcia.

Diandria.

Salix alba 447–1
arenaria 447–3
fragilis 448–8
amygdaloides 448–9
pentandra 449–12
rosmarinifolia 447–2
herbacea 448–7
reticulata 449–13
repens 448-6
caprea 449–15
viminalis 450–21
purpurea 450–22

Triandria.

Empetrum nigrum 444–1

Tetrandria.

Viscum album 464–1
Hippophae [Hippophaæ]
Rhamnoides 445–1
Myrica Gale 443–1

Pentandria.

Humulus Lupulus 137–1

Hexandria.

Tamus *communis* 262–1

Octandria.

Populus tremula 446–3
nigra 446–1
alba 446–2
Rhodiola Rosea 269-4

Enneandria.

Mercurialis perennis 138-1
annua 139–2
Hydrocharis Morsus
ranæ 290–2

Monadelphia.

Juniperus communis 444–1–2
Sabina 444–1
Taxus baccata 445-4

Syngenesia.

Ruscus *aculeatus* 262–1

Classis XXIII. Polygamia.

Monœcia.

Holcus lanatus 404–14
[mollis 404–15]
Valantia *Cruciata* 223–1
Aparine 225–2
Parietaria officinarum 158–1
A[t]riplex hastata 151-1
patula 151–2
maritima 152–8
pedunculata 153–10
portulacoides 153–11
littoralis 153–12
Acer *Psevdo-Platan.* 470–1
campestre 407–2

Diœcia.

Fraxinus excelsior 469–1

Classis XXIV. Cryptogamia.

Filices.

Equisetum arvense 130–2
sylvaticum 130–4
palustre 131–7–9
fluviatile 130–1
limosum 131–10
hyemale 131–11
Ophiogloss. vulgatum 128–1
Osmunda regalis 125–4
Lunaria 128–1
Spicant 118–1
Acrostichum septentrionale 120–1
ilvense 118–1
Thelypteris 121–6
Pteris aqvilina 124–1
Asplenium Scolopendr. 116–1
Ceterach
[*Ceterach*] 118–1
marinum

Asplenium [*marinum*] 119–2
Trichomanes 119–1
Trich. ramos. [*Trich. ramos.*] 119–2
Ruta muraria 122–1
Adiant. nigr. [*Adiant. nigr.*] 126–10
Polypodium vulgare 117–1–2
cambricum [*cambricum*] 117–3
Lonchitis [*Lonchitis*] 118–2
Filix mas 120–1
aculeatum [*aculeatum*] 121–2
Phegopteris 122–8
Dryopteris 125–6
Polypodium fragile 125–7
Adiantum Capillus ♀ [*Capillus* ♀] 123–1
Trichoman. tunbrigensis [*tunbrigensis*] 123–2
Pilularia globulifera 136–1
Isoetes lacustris 306–1

Musci.

Lycopodium Selago 106–1
Selaginoides 106–1
clavatum 107–1
annotinum 107–2
alpinum 108–3
inundatum 108–4
denticulatum [*denticulatum*] 108–1

Dubia [Obscuræ].

[Page]

137 Salicornia
3 myosuroides procumbens.
4 ramosior procumbens.
5 cupressiformis erecta.

141 Lapathum
5 minimum *C. B. Pet. t.* 3 *f.* 4.
6 viride *Pet. t.* 2 *f.* 6.
(9 Anthoxanthon *J. B.*).
10 aureum *Pet.* 1, 2 *f.* 7 (*Lob.* 286).

145 Persicaria
2 minor *C. B.*
3 angustifolia *C. B.*
10 subtus incana *Pet. t.* 3 *f.* 10.

148 Potamogeton
3 fol. pellucido gramineo.
12 fol. longissimo.
13 (maritimum *Pluk. t.* 216 *f.* 5).
14 tenuifolium *Pet. t.* 5 *f.* 12.

151 Myriophyllum 18 minus *Moris.* 3 *f.* 15, i. 4 *f.* 7.

152 Atriplex
3 maritima angustifolia *C. B.*
4 angustifol. laciniata *Raj.*
7 marina valerandi *J. B.*

154 Chenopodium
6 procumbes lucidun. *Moris.*
8 erect. chrysanth. folio.
9 ficus folio *Pet.* 8 *f.* 3
10 folio subrotundo *Pet.* 8 *f.* 4 (folio oblongo integro *Dill.*).
13 oleo folio.
17 Sedum frutic. minus, alt. *C. B.*

162 Lactuca
3 sylvestris latifolia *Pet.* 15, 1.
(4 Chondrilla viscos. humil. *C. B. Pluk.* 61 *f.* 5.)

163 Sonchus
5 rotundo folio *Pet.* 14, 1.
6 aphyllocaulis *Pluk.* 62, 4.

165 Hieracium	(7	Castorei odore *Pet.* 12 *f.* 3.)
	(11	mont. latif. glabr. min. *C. B.*)
	16	saxatile *C. B. prodr.* 66. *Col.* i. 21.
	2	frutic. latif. glabr. *C. B.*
	7	Pulmonaria angustifolia.
	13	fruticos. alpinum.
	14	flore singulari *Pluk.* 37 *f.* 3.
171 Leontodon	4	Hierac. mont. ang. *C. B.*
186 Chamœmelum	5	(inodorum annuum).
	8	marinum *J. B.*
189 Artemisia	5	tenuifol. narboneus. *J. B.*
	6	anglica maritima.
(209 Smyrnium	2	tenuifolium *Tab.* 8.)
217 Peucedanum	1	minus *C. B.*
226 Cynoglossum	2	sempervirens.
232 Mentha	4	crispa verticillata *C. B.*
	8	aromatica *tab.* 10 *f.* 1.
242 Sideritis	3	hirsuta lutea *Pet.* 33 *f.* 10.
244 Scutellaria	2	fl. purpurascente *T.*
(251 Malva	3	fl. parvo cæruleo.)
[254 Caryophyllata	5	pentaphyllea *J. B.*]
255 Potentilla	3	(minus rep. aur. *C. B.*)
	4	repens aureum.
270 Sedum	6	non acre album *t.* 12.
(281 Veronica	12	chamædryoides.)
286 Centaurium	2	luteum minimum.
(287 Verbascum	2	pulverulentum.)
(291 Cheiranthus	1	marit. folio sinuato *C. B.*)
294 Turritis	4	exilis *Pluk.* 80 *f.* 2.
301 Nasturt. aquat.	2	præcoius *Pet.* 47 *f.* 3.
303 Cochlearia	3	folio sinuato *C. B.*
306 Subularia	2	repens *Dill. musc.* 81.
321 Vicia	4	semine rotundo nigro *C. B.*
328 Trifolium	3	ochroleucon.
	(8	capit. dipsaci *Pluk.* 113 *f.* 4.)
	9	glomerulis mollioribus *t.* 13.
334 Lotus	2	fruticosior.
	3	flore majore *C. B.*
336 Dianthus	3	sylvestres [sylvestris] 3 *Lob.* 443.
342 Cistus	3	*Dill. elth. t.* 145 *f.* 173.
	4	*Dill. elth.* 4, 145 *f.* 172.
(344 Hypericum	8	eloides *Clus.*)
349 Cerastium	4	hirsut. mag. flore *C. B.*
356 Drosera	3, 4, 5	perennis.
(358 Geranium	8, 9, 13	columbinum.)
367 Reseda	2	polygalæ folio.
369 Allium	2	bicorne proliferum.
	(6	amphicarpon.)
377 Orchis	5	obscure purpurea.
	23	pusilla alba.
	24	speciosa.
	25	rubra *C. B.*

386	Ophrys	3 minor *Pluk.* 247 *f.* 2.
391	Gramen	4 foliis pungent. *Pluk.* 33 *f.* 4.
		6 spica foliacea *C. B.*
396		4 alopecurus maximus.
397		3 Myosuroides nodosum *t.* 20 [26] *f* 4.
		(3 typhynum nodosum.)
404		15 paniculat. molle.
(410		10 fol. juncus rad. alba *C. B.*)
411		14 arundinac. aquatic.
		15 nemorosum.
413	Festuca	2 spicis erectis.
		3 paniculis confestis.
		9 elatior.
		10 avenaceum dumetorum.
418	Carex	4 spadiceo viridis.
		5 spica recurva.
		9 spicis teretibus.
		10 sylvarum tenuius [tenuinus].
		13 spic. pend. longiore.
		15 spic. 3 subrotundis.
		16 spic. longissime distant.
		17 spica divulsa.
		19 folio molli.
422		1 palustre elatius.
		4 spica multifera.
		9 spicis compactis.
		(14 spica compressa.)
447	Salix	4 inferne lanuginosa.
		5 inferne cinerea.
		11 foliis subcæruleis.
		14 foliis longissimis viridibus.
		17 folio rotund. minore.
		18 Caprea pumila.
455	Rosa	6 pomifera, fructu spinoso.
471	Erica	2 (myricæ folio).
		6 daboeci [cantabrica] *Pet. gaz. t.* 27 *f.* 4 [*Raj. dendr. opp.* 98].

[It will be observed that certain of the Dubiæ of ed. 1 are taken into the named list in ed. 2—e. g. *Hypericum elodes*, *Trifolium squamosum*.]

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